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THE HOSPITALIZATION OF THE "CRIMINAL INSANE" IN VICTORIA.¹

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CRIMINAL INSANITY, as it concerns the psychiatrist, presents three specific problems. The first is theoretical and medico-legal—what constitutes criminal insanity? The second deals with legal mechanisms of certification and confinement of the criminal insane. The third is essentially clinical—an investigation of the mentally ill person who has committed an antisocial act. It will be the main subject of this paper. However, some introductory remarks about the medico-legal aspects are warranted.

The battle about the M'Naghten Rules continues. It is my impression that the battlefield has shifted from court rooms, where the M'Naghten Rules are stretched to non-existence by modern and humane judges, to psychiatric and legal journals, where neither party is prepared to give an inch. Viscount Simon, in an article entitled "The Doctor in the Witness Box", states clearly that criminal responsibility is a legal and not a medical question. He further states that a person of unsound mind may,

nevertheless, be criminally responsible. Slater, on the other hand, accuses the branch of common law relating to criminal responsibility of being "frozen", criticizes the large measure of control the judge exercises on the jurists' decision, and states that the M'Naghten Rules are inequable as between case and case and not candidly applied. Henderson, in his reflections on criminal conduct, deprecates the violent methods of punishment and retribution as having little constructive value. He writes:

The legal outlook is too greatly dominated by intellectualistic and moralistic points of view, by concepts of reason and free will, and by lack of appreciation of the fact that conduct is motivated by instinctive drives.

Legal systems in various countries are aware of the necessity to change outmoded concepts of insanity and criminal conduct. In Scandinavia, the question is no longer whether the accused is sane or insane, but whether punishment is a rational or irrational method of treatment in a given case. Special boards advise the court on the mental condition of the accused. This procedure is without doubt preferable to the appearance of the psychiatrist as an expert witness for the defence and/or prosecution. The latter procedure is clearly not in the interest of the court being advised with complete detachment—the psychiatrist inevitably, if unconsciously, identifies with the cause, be it defence or prosecution; nor is it in the interest of psychiatric evidence being held in highest esteem, because it highlights conflicting opinions and theories rather than illuminating the case in point.

¹ Read at the annual meeting of the Australasian Association of Psychiatrists on October 14, 1959, at Sydney.

In some States of the United States of America, the Briggs Law of Massachusetts (the court appoints a panel of experts) and the Durham Decision (a person whose criminal act was the result of mental illness or defect cannot be regarded as criminally responsible) are formally replacing the M'Naghten Rules. American lawyers throughout the last hundred years have, in fact, shown more understanding and wisdom in dealing with the problem of criminal insanity than their more rigid and punitive colleagues in the United Kingdom. Judge Doe, an American, wrote in 1866:

The law does not define disease. What is a diseased condition of the mind is to be settled by science and not by law—the municipal civil law established by man for human government does not declare what is a disease of the mind any more than it declares what is a disease of the lungs or the liver.

One cannot help but compare this statement with that of the Lord Chancellor of England, who in the same year deplored the introduction into criminal law of medical opinion and medical theories "proceeding upon the vicious principle of considering insanity as a disease".

Society is without any doubt entitled to protection from antisocial acts by individuals. However, the isolation or removal of the law-breaker from society must be done rationally; a moralistic attitude towards the accused will invariably produce concepts like "rehabilitation by punishment" or a belief in the deterrent power of stiff gaol sentences. It must be stated clearly that psychiatry has no intention of assuming the role of protector towards the law-breaker, using psychiatric theories to excuse the antisocial act. Let us not overlook the fact that persons certified as criminal insane and committed to appropriate institutions, on an average, spend longer periods in confinement than those sentenced to serve in penal institutions.

Major crimes are not unfrequently committed by psychologically abnormal people. Statistics in the United Kingdom illustrate this by showing that in 22% of murders the accused or suspect committed suicide; 14% were found unfit to plead, and of those found guilty, 39% were subsequently found to be mentally ill.

The term "criminal insane" has always struck me as a *contradictio in adjecto*; one cannot be criminal and insane at the same time. Lord Justice Clark Inglis has formulated this objection clearly by stating:

In a strictly legal sense there is no insane criminal, concede insanity and the homicidal act is not criminal. The act of the insane which in the sane would be criminal lacks every element of crime.

Turning to our second problem, the legal mechanisms of admission to hospital, we note that in Victoria persons who have committed an indictable offence while suffering from a mental illness are admitted to hospital either under Section 69 of the *Mental Hygiene Act* or under Section 420 and Section 393 of the *Crimes Act*. In rare cases, they may be admitted as voluntary boarders. Section 69 of the *Mental Hygiene Act* states that the Chief Secretary upon receipt of two medical certificates may order that persons imprisoned either under sentence or pending trial be committed to a mental hospital; patients remain under jurisdiction of the Chief Secretary, and are commonly called Crown prisoners. The Chief Secretary may grant trial leave in some cases, but must discharge the patient upon the receipt of two certificates as to the sanity of the patient. Important amendments to this section of the Act are included in the Bill at present before Parliament.

Section 420 of the *Crimes Act* was created to solve a legal impasse. Let us assume that a murder was committed while the accused was obviously mentally ill. At the time of the trial he has recovered. The accused is acquitted on account of insanity, but cannot be certified as insane at the time of the trial. The court then orders such person to be kept in strict custody in such place and in such manner as the court seems fit, until the Governor's pleasure is known.

Section 393 reads like a chapter from the Spanish Inquisition. In its essence, if a person while indicted or during trial appears to the jury to be insane, the court shall order him to be kept in custody until the Governor's pleasure shall be known. Furthermore, if any person who has been charged with an indictable offence is brought before a court to be discharged for want of prosecution and such person appears to be insane, the court shall order such person to be kept in strict custody until the Governor's pleasure shall be known. I should like to draw your attention to the fact that in this section of the *Crimes Act* the diagnosis of insanity is made by the court or jury respectively—no medical certificates are required; it appears that the opinion of the Lord Chancellor in the nineteenth century still inspires the wording of the Act.

The third method of admission to hospital consists of releasing on a bond a patient who has committed the criminal offence as the result of mental disease, and stipulating his entering a mental hospital as a voluntary boarder. This method is applied occasionally by psychologically orientated judges to young psychopaths who are not certifiable, will obviously not be benefited by a gaol sentence and have to be segregated from society.

The vast majority of patients admitted as criminal insane are certified under Section 69 of the *Mental Hygiene Act*. Certification depends largely on the circumstances under which the offence has been committed; mental illness *per se* and the type of offence play only a small part in the procedure. Certification as insane prior to the offence or admission to hospital makes a person virtually immune against this serious medico-legal allegation.

The schizophrenic who tears up the *Encyclopædia Britannica* in the library of a private hospital is reprimanded, given more electroconvulsive therapy or possibly certified to a receiving house. The schizophrenic who tears up a Bible in a bookshop or church is invariably taken into custody, charged with wilful damage and certified as criminal insane.

The manic patient who behaves aggressively while in a permissive home environment or in hospital is humoured or tranquillized. The same act committed in the street may mean arrest and certification as criminal insane. Let us consider the extreme crime, murder. The epileptic in a mental hospital who in an attack of furor strikes and kills a nurse is restrained and held in a security ward. The same offence committed outside the precincts of a hospital obviously brings about the verdict of criminal insanity. The definition of criminal insanity we therefore arrive at is as follows: "An offence against the law, committed by a person thought to be sane who is subsequently found to be mentally ill to a certifiable degree."

Present Investigation.

Having passed through the somewhat barren fields of medico-legal controversy, I made an attempt to obtain objective data pertaining to the problem. The inquiry extended to all patients admitted to the Kew and Ararat Mental Hospitals as criminal insane between January 1, 1949, and January 1, 1959, or in hospital on January 1, 1959, irrespective of their admission date. Ararat is a country mental hospital which contains a security ward for criminal insane patients. Kew is a long-term mental hospital within the metropolitan area. Initially, patients of Kew and Ararat were investigated separately; but, contrary to expectations, comparison of findings between the groups showed remarkable uniformity in almost every detail of the analysis; results were therefore amalgamated. Case histories, certifying documents and warrants were subjected to a detailed analysis. I had hoped for the emergence of psychodynamic patterns; but large gaps in case-note entries and in many instances conventionally descriptive psychiatric observations made any attempts in this direction impossible.

Results.

Altogether 122 male and nine female patients were included in the investigation. Of these, 18 made a complete recovery and were decertified; however, only five

were discharged into the community—13 returned to gaol. Two patients were deported as undesirable immigrants; 11 spent some period on trial leave, having made a partial recovery (they all relapsed and were returned to hospital). Four patients died during their period in hospital, and 10 were transferred to other institutions. Twenty-six patients escaped at some stage of their period in hospital; all but four were returned to hospital by the police.

Table I shows the distribution of types of mental illness amongst the offenders. The schizophrenic reaction type dominates the picture; 79 out of a total of 131 patients belong to this group. The number of paranoid patients is small. Mental deficiency, with or without psychoses, constitutes the second largest group; the majority of these subjects were in the high imbecile or feeble-minded range. Six patients had an organic mental illness; three of them

TABLE I.

| Mental Illness. | Number of Subjects. | | |
|---|---------------------|---------|--------|
| | Male. | Female. | Total. |
| Schizophrenia | 58 | 2 | 60 |
| Paraphrenia | 13 | 1 | 14 |
| Schizo-affective | 3 | — | 3 |
| Late paraphrenia | — | 1 | 1 |
| Schizophrenic episode | 1 | — | 1 |
| Paranoia | 3 | — | 3 |
| Mental deficiency | 24 | 1 | 25 |
| Mental deficiency and psychosis | 2 | — | 2 |
| Organic reaction type | 6 | — | 6 |
| Depression | 1 | 2 | 3 |
| Mania | 2 | 1 | 3 |
| Psychopathy | 3 | 1 | 4 |
| Prison psychosis | 4 | — | 4 |
| Malingering | 2 | — | 2 |
| Total | 122 | 9 | 131 |

suffered from general paralysis of the insane; two had extensive cerebral degeneration, one from ligation of the anterior cerebral artery, the other from frequent head injuries sustained during a career as a professional boxer. The sixth patient suffered from Korsakow's psychosis. Manic-depressive illness was responsible for a very small proportion of offences. The subjects with character disorders number 10 in this series; they were in a somewhat arbitrary fashion subdivided into psychopaths proper, prison psychotics and malingers.

Table II lists the offences committed prior to certification. Some were committed many years before the offender's admission to hospital; others preceded it by only some days or weeks. The grouping again does not pretend to be legally precise; the first main group deals with offences associated with violence against a person, the second group brackets together major and minor sex offences, and the third contains a miscellaneous assortment of offences of a minor nature. Murder, indecent assault, breaking and entering, theft and vagrancy score highest. There is approximately the same number of major and minor offences. Offences committed by females are restricted to murder, assault with intent to kill, offensive behaviour, vagrancy and neglect of baby. Wilful killing of an animal and obscene language are listed as sex offences on the basis of a history of previous sex offences committed by the same person, and frank sexual gratification associated with the act of killing.

In Table III an attempt has been made to correlate mental illness with the offence committed. The grouping of offences was simplified (homicide for murder and manslaughter, sex offences generally, etc.); so was the grouping of mental disorders (schizophrenia, character disorders, etc.). Clusters can be seen under the headings schizophrenia and homicide, schizophrenia and breaking and entering, schizophrenia and theft, schizophrenia and vagrancy, and mental deficiency and sex offences. Smaller clusters occur under the headings mental deficiency and

TABLE II.

| Offence Prior to Admission to Hospital. | Number of Subjects. | | |
|---|---------------------|---------|--------|
| | Male. | Female. | Total. |
| Murder | 20 | 3 | 23 |
| Manslaughter | 2 | — | 2 |
| Assault with intent to kill | 5 | 2 | 7 |
| Inflicting grievous bodily harm | 2 | — | 2 |
| Malicious wounding | 2 | — | 2 |
| Robbery and violence | 4 | — | 4 |
| Robbery | 1 | — | 1 |
| Assault and rape | 1 | — | 1 |
| Indecent assault | 13 | — | 13 |
| Incest | 1 | — | 1 |
| Bestiality | 1 | — | 1 |
| Indecent exposure | 1 | — | 1 |
| Obscene language | 1 | — | 1 |
| Wilful killing of animal | 1 | — | 1 |
| Breaking and entering | 15 | — | 15 |
| Theft and larceny | 10 | — | 10 |
| Arson | 1 | — | 1 |
| Malicious damage | 1 | — | 1 |
| Attempt to wound | 1 | — | 1 |
| Assault | 3 | — | 3 |
| Unlawful possession | 6 | — | 6 |
| False pretence and fraud | 1 | — | 1 |
| Perjury | — | 1 | 1 |
| Offensive behaviour | 5 | 1 | 6 |
| Threat to kill | 2 | — | 2 |
| Vagrancy and insufficient means | 21 | 1 | 22 |
| Neglect of baby | — | 1 | 1 |
| Total | 122 | 9 | 131 |

murder and schizophrenia and sex offences. All three depressives committed murder; similarly all three paranoiacs committed or attempted murder. Neither the organic reaction type nor mania was responsible for a major offence.

The recovery or improvement rate followed textbook patterns (Table IV). Nine out of a total of 79 schizophrenics recovered or improved; approximately half the remainder adjusted themselves to hospital life; the rest remained unchanged. Paranoiacs did not improve. The vast majority of mental defectives adjusted themselves to hospital life to an almost incredible degree, and could be described as "contented". Of the organic reaction type of subjects, two recovered, two adjusted themselves to hospital life, and two showed progressive dementia. The cyclothymics showed a 100% recovery rate. The prison psychotics and malingers recovered; the psychopaths showed no change.

TABLE III.

| Offence. | Schizo- phrenic Disorders. (79) | Paranoia. (3) | Mental Deficiency. (25) | Mental Deficiency and Psychosis. (2) | Organic Reaction. (6) | Mania. (3) | Depression. (3) | Character Disorder. (10) | Total. |
|----------------------------------|--|------------------|-------------------------------|--|-----------------------------|---------------|--------------------|--------------------------------|--------|
| Homicide | 13 | 2 | 5 | — | — | — | 3 | 2 | 25 |
| Assault with intent to kill .. . | 6 | 1 | — | — | — | — | — | — | 7 |
| Inflicting grievous bodily harm | — | — | 1 | — | — | — | — | 1 | 2 |
| Malicious wounding .. . | 2 | — | — | — | — | — | — | — | 2 |
| Robbery and violence .. . | 3 | — | — | — | — | — | — | 2 | 5 |
| Assault, attempt to wound .. | 4 | — | — | — | — | — | — | — | 4 |
| Threat to kill .. . | 2 | — | — | — | — | — | — | — | 2 |
| Sex offences .. . | 5 | — | 13 | 1 | — | — | — | 1 | 20 |
| Breaking and entering .. . | 10 | — | 1 | 1 | 1 | — | — | 2 | 15 |
| Theft, larceny .. . | 8 | — | 2 | — | — | — | — | — | 10 |
| Unlawful possession .. . | 3 | — | 1 | — | 1 | 1 | — | — | 6 |
| False pretences, fraud, perjury | 1 | — | — | — | 1 | — | — | — | 2 |
| Arson, malicious damage .. | 2 | — | — | — | — | — | — | — | 2 |
| Offensive behaviour, drunkenness | 4 | — | — | — | — | 2 | — | — | 6 |
| Vagrancy, insufficient means .. | 16 | — | 1 | — | 3 | — | — | 2 | 22 |
| Neglect of baby .. . | — | — | 1 | — | — | — | — | — | 1 |

In Table V, major and minor offences are shown in turn correlated with (a) first breakdown and previous mental illness, (b) first or previous offences, and (c) certification during remand (pending trial) and certification under sentence. In the case of major offenders, first breakdown and previous mental illness are evenly divided; patients who had committed minor offences were shown to have had a higher incidence of previous mental illness. Major offenders tended to be first offenders, minor offenders were recidivists. Again, the majority of major offenders were certified while on remand; the reverse held with minor offenders.

The employment classification in Table VI only loosely follows conventional headings. Certain subheadings, such as self-employed, are absent, simply because there were no patients in this category. Seventy-one patients, or 59%, belonged to the unskilled labour group; the percentage in

the population is 25. Rural and skilled labour percentages match closely the percentage in the population; the clerical and professional groups are represented by one patient and two patients respectively in a series of 131 patients, or 0.8% and 1.6%, compared with the population percentages of 5% and 25% respectively.

Table VII, showing religious denominations, reveals a close parallel with the percentage in the population in the case of Church of England patients, and significant deviation from the normal in the case of other Protestant denominations and Roman Catholics. Of the patients, 72% were unmarried, compared with 25% in the general population (over 15 years of age), and correspondingly only 16% were married, against 64% in the general population.

The percentages for British and non-British migrants (12% and 16%) are taken in relation to the total patient

TABLE IV.

| Mental Illness. | Recovered. | | Improved. | | Hospital-Adjusted. | | No Change. | | Total. |
|--|------------|---------|-----------|---------|--------------------|---------|------------|---------|--------|
| | Male. | Female. | Male. | Female. | Male. | Female. | Male. | Female. | |
| Schizophrenia .. . | 3 | — | 2 | — | 23 | 1 | 30 | 1 | 60 |
| Schizo-affective .. . | 2 | — | — | — | — | — | 1 | — | 3 |
| Paraphrenia .. . | — | — | 1 | — | 8 | — | 4 | 1 | 14 |
| Laté paraphrenia .. . | — | — | — | — | — | 1 | — | — | 1 |
| Schizophrenic episode .. . | 1 | — | — | — | — | — | — | — | 1 |
| Paranoia .. . | — | — | — | — | 2 | — | 1 | — | 3 |
| Congenital mental defect .. | — | 1 | 2 | — | 19 | 1 | 2 | — | 25 |
| Congenital mental defect and psychosis | — | — | — | — | 1 | — | 1 | — | 2 |
| Organic reaction .. . | 2 | — | — | — | 2 | — | 2 | — | 6 |
| Depression .. . | 1 | 2 | — | — | — | — | — | — | 3 |
| Mania .. . | 3 | — | — | — | — | — | — | — | 3 |
| Psychopathy .. . | — | — | — | — | — | 1 | 3 | — | 4 |
| Prison psychosis .. . | 3 | — | — | — | — | — | 1 | — | 4 |
| Malingering .. . | 2 | — | — | — | — | — | — | — | 2 |

number; the validity is subject to some doubt, as migration to Australia has fluctuated and increased greatly during the last 10 years. These percentages are in an inverse ratio to the percentage in the population, and are in addition significantly higher.

TABLE V.

| Group. | Major Offence. | | Minor Offence. | | Total. |
|--------------------------------|----------------|---------|----------------|---------|--------|
| | Male. | Female. | Male. | Female. | |
| First breakdown | 26 | 3 | 28 | 2 | 59 |
| Previous mental illness | 26 | 1 | 42 | 3 | 72 |
| Total | 52 | 4 | 70 | 5 | 131 |
| First offence | 40 | 4 | 28 | 4 | 76 |
| Previous offences | 12 | — | 42 | 1 | 55 |
| Total | 52 | 4 | 70 | 5 | 131 |
| Certified while on remand | 34 | 4 | 15 | 1 | 54 |
| Certified while under sentence | 18 | — | 55 | 4 | 77 |
| Total | 52 | 4 | 70 | 5 | 131 |

The age of male patients on their admission to hospital ranged from 15 to 71 years, with a mean of 35 years.

Discussion.

Patients admitted to mental institutions as criminal insane represent only a small fraction of mentally ill

TABLE VI.

| Employment. | Name of Subjects. | | Percentage for Male Patients. | Percentage in Population. |
|-----------------------|-------------------|---------|-------------------------------|---------------------------|
| | Male. | Female. | | |
| Rural | 12 | — | 10 | 15 |
| Unskilled labour | 71 | — | 59 | 25 |
| Skilled labour | 23 | — | 19 | 15 |
| Clerical | 1 | 1 | 0.8 | 25 |
| Professional | 1 | — | 0.8 | 5 |
| Armed forces | 2 | — | — | — |
| In receipt of pension | 3 | 1 | — | — |
| Home duties | — | 3 | — | — |
| Domestic | — | 3 | — | — |
| Nil | 9 | 1 | — | — |
| Total | 122 | 9 | — | — |

prisoners. As early as 1916, mental examinations of several hundred prisoners admitted consecutively to Slingsby prison showed 59% to be mentally diseased. More searching inquiries of today may put this figure much higher; surveys in penal institutions by the Rockefeller Foundation again put the percentage of prisoners suffering from abnormal mental states having a close relationship to their antisocial behaviour as 60. On the other hand,

the number of patients admitted as criminal insane to the Kew and Ararat mental hospitals over a ten-year period represent only 1.6% of the total admission rate. The percentage of criminal insane patients within the hospital population is slightly higher (4%), as their discharge rate, for obvious reasons, lags behind that of non-criminal patients.

No average figure for duration of stay in hospital could be derived, because patients were admitted throughout the period under consideration. However, half the number of patients were admitted before 1949 and had therefore already spent a minimum of ten years in hospital, which bears out the statement that certification as criminal insane, on an average, produces longer segregation from the community than a gaol sentence.

TABLE VII.

| | Number of Subjects. | | Percentage. | Percentage in Population. |
|--------------------------------|---------------------|---------|-------------|---------------------------|
| | Male. | Female. | | |
| Religious denomination: | | | | |
| Church of England | 42 | 6 | 37 | 35 |
| Other Protestant denominations | 19 | 1 | 15 | 26 |
| Roman Catholic | 40 | 2 | 32 | 22 |
| Greek Orthodox | 4 | — | — | — |
| Unknown | 17 | — | — | — |
| Total | 122 | 9 | — | — |
| Marital status: | | | | |
| Unmarried | 93 | 1 | 72 | 25 |
| Married | 17 | 4 | 16 | 64 |
| Widowed | 3 | 3 | 5 | 7 |
| Divorced | 3 | 1 | 3 | 1 |
| Not known | 6 | — | — | — |
| Total | 122 | 9 | — | — |
| Type of migrant: | | | | |
| British | 15 | — | 12 | 9 |
| Non-British | 19 | — | 16 | 6 |
| Total | 34 | — | 28 | 15 |

The sex discrepancy (122 males, 9 females) is surprising, in view of the fact that the numbers of male and female patients admitted to mental hospitals in Victoria are about equal. Society is apt to overlook certain minor offences in females; violent behaviour in this sex has usually no far-reaching consequences, and aberrant sexual behaviour, although present, is again tolerated by law and the community. Nevertheless, the discrepancy is so great as to suggest that some more basic behavioural difference is involved—namely, one of comparative lack of aggression in the female sex. Of 122 males, only 21 committed offences which were essentially non-aggressive in nature. The whole gamut of robbery, breaking and entering, sex offences, arson, malicious damage, assault and threat to kill, is confined to the male sex. However, if we recall the distribution of female offences, we see a gap between four cases of non-aggressive offence and five cases of murder and assault with intent to kill, so that one must reluctantly come to the conclusion that when the female strikes, she strikes to kill.

Twenty-six of the total of 131 patients escaped during their period in hospital. I consider this state of affairs unavoidable if a certain amount of freedom necessary for their rehabilitation is given. After all, the law arranges their admission for the specific purpose of treatment as well as segregation; furthermore, had a similar number of offenders been sentenced to terms of imprisonment, a very much greater number would have been returned to the

community within this period. One further point: not one escapee committed a major offence while at large. Likewise, patients on trial leave did not commit offences, but were almost invariably returned to hospital because of a relapse of their mental condition. As a rule, the patient who has recovered is decertified and discharged or returned to penal institutions. At times, trial leave is granted to a depressive who has recovered; but legal authorities are unwilling to grant a discharge, following the policy of "let's wait and see how the patient will get along outside". This view is to be deplored. No guarantee of freedom from further attacks can ever be given. The trial leave situation, on the other hand, acts as a perpetual psychic trauma, and may even precipitate a further attack. Occasionally a patient who has recovered from a schizophrenic attack and is ready for discharge from hospital may be required to serve the remainder of his gaol sentence for a minor offence committed while he was psychotic. The psychiatrist usually advises against his return to gaol, and recommends that the time spent in hospital be considered as part of the sentence. This request is nearly always granted by the penal authorities.

The distribution of mental diseases in this series deserves some discussion. Of the patients, 60% were schizophrenic. The incidence of schizophrenia on admission to a mental hospital is given by Henderson and Gillespie as 15%. The 1951 statistics for Victoria give it as 20%. The incidence of paranoid states in the community is difficult to assess; it is very probably much higher than the admission rate leads us to believe; it is 2% in our series and 10% in the 1951 statistics for Victoria. The last figure is subject to grave doubt; I believe that a stricter diagnostic standard would lower it considerably. Contrary to textbook opinions, the paranoiac's share of homicides is small—he must have a fair measure of control; however, if he commits an offence, it is usually homicide. There were three cases of paranoia in our series; two of the subjects committed homicide, and one shot and wounded two people with the intention of killing them. Mental defectives constituted 10% of our series, compared with 13% of patients admitted to mental hospitals. I could not find any evidence that mentally defective patients were being led to crime by other persons; rather, they committed the offence impulsively without grasping its significance.

The number of organic reaction types was small. None of these people were involved in serious offences; the over-all control still seems strong enough to prevent antisocial conduct. These disorders comprise 5% of cases, compared with 37% of admissions to mental hospitals.

Depressives and manias are each represented by 2%, compared with 10% and 6% respectively of admissions to hospitals. The suicidal attempt, although legally constituting an offence, almost never leads to prosecution. The depressives, in our group, all committed homicide, always involving a member or members of their own family.

The character disorders account for 7% of patients in the group, compared with 0.3% of those admitted to mental hospitals. They were returned to prison, either recovered in the case of prison psychotics or malingers, or unrecovered but legally sane in the case of the true psychopath. The psychopaths were certified, either because of suicidal attempts, or because they exhibited bizarre conduct and pseudo-hallucinatory phenomena. Their subsequent behaviour in hospital confirmed the diagnosis. Environmental precipitants were always present prior to the suicidal gesture; the appeal character or thinly overlaid aggression was obvious. (According to Batchelor, one-fifth of all suicidal gestures are attributed to psychopaths.) The prison psychoses were Ganser-like syndromes midway between malingering and an hysterical state of more unconscious motivation. These persons derived, or at least thought of deriving, some benefit from their mental state. Disorientation and at times hallucinatory phenomena were present. After these had cleared up completely, the subjects exhibited amnesia for the psychotic period, in sharp contrast to the malingers,

who as an almost sporting gesture described their attempt to better themselves by simulating madness.

The consensus of opinion amongst psychiatrists is that admission of psychopaths to mental hospitals should be avoided at all costs. It disturbs the rest of the patient population, and the psychopath himself feels more or less free to commit any offence whilst in hospital. Scandinavia practises security detention of psychopathic offenders in special institutions. Aungie, who surveyed the situation recently, rightly criticizes security detention in Norway, which follows the term of imprisonment. Again, in Sweden, we see indeterminate sentences for psychopaths in an absence of a really therapeutic regime. Denmark seems to lead the way with its therapeutic community at Herstedvester; it avoids defining the state of psychopathy, but an offender is accepted who "displays an abnormal mental state not amounting to insanity". There is a definite advantage in admitting a doubtfully psychotic prisoner to a psychiatric unit of the prison for observation; the prison psychosis will clear rapidly, while the true-blue psychotic will remain unchanged and may then be transferred to a mental hospital.

Epilepsy *per se* and the group of psychoneuroses were conspicuous by their absence in our series. This comes as a surprise in the case of epilepsy, in which equivalents, automatisms and furor states are considered to be conditions leading to aggressive and at times homicidal behaviour. Alcohol played a very small part in the aetiology and precipitation of offences committed in our series; however, it may be that case histories were not detailed enough to allow an exact assessment of this factor.

To come now to the type of offence committed, minor offences—for example, vagrancy, false pretences, insufficient means, unlawful possession—account for a considerable number of cases. There is no doubt that these offences should not lead to the classification "criminal insane". The arrested vagrant who appears mentally ill should be certified under the appropriate section of the *Mental Hygiene Act* and subsequently not be under any legal jurisdiction. This would facilitate the handling of such patients enormously—for example, trial leave arrangements, freedom, parole, rehabilitation.

A close analysis of sex offences cast a certain doubt on the evidence given in these cases. Public opinion is loaded against the offender. The young, high-grade mental defective, socially well adjusted and working in the community, who is accused of wilful exposure on at times shaky evidence, should not be condemned to what virtually means life imprisonment; the same offence in a "normal" person often means a fine or a four weeks' gaol sentence.

The correlation of mental illness with offence highlights homicide in schizophrenics. Perusal of the case histories indicates that the schizophrenic kills impulsively, probably always under the influence of an hallucinatory experience, invariably notifies the police, and in no way attempts to hide the offence. The person killed is not always mentioned as being involved in the schizophrenic delusion. Schizophrenic sex offences are exclusively committed against persons of the same sex, usually small boys. Breaking and entering offences, again, appear senseless and purposeless. The offence of vagrancy needs no discussion; it fits perfectly into the psychiatric picture of the withdrawn, autistic and passive schizophrenic.

Mental defectives occasionally commit homicide as a child will tear up a doll or remove the evidence of a broken vase by throwing the pieces into a dustbin. They are the sex offenders *par excellence*, far more dangerous than schizophrenics or psychopaths. We find the classical description of the mental defective sex offender in Steinbeck's "Of Mice and Men".

The subjects with character disorders committed offences over a wide range. A subdivision revealed that the psychopaths committed homicide, the prison psychotics were convicted of minor offences, and the malingers were accused and convicted of robbery with violence.

A study of the correlation of major and minor offences with certification showed that patients who had committed minor offences were in the vast majority of cases certified while serving sentences. It is difficult to believe in a sudden development of a mental illness; it seems far more likely that a mental illness existed at the time of the offence, probably being responsible for it. The patient was usually not legally represented, and if so, a short prison sentence was preferred to a plea of insanity and the possibility of lifelong "imprisonment" in a mental hospital. In major offences, legal representation was the rule; the accused was psychiatrically examined and in some cases the Crown decided to choose certification in preference to prosecution and sentence. Thus, the figures in Table V reflect society's attitude and legal mechanisms rather than the existence or non-existence of mental illness.

A review of the occupations of criminal insane patients reveals the overwhelming preponderance of unskilled labourers, far in excess of the percentage in the population. This finding, incidentally, is repeated in an analysis of occupations of any long-term mental hospital population. Is mental illness generally, and schizophrenia in particular, a disease of lower strata of the population? Although it appears so superficially, it seems more likely that the incidence is the same in all levels of society, but the recovery rate in the upper strata is far greater. These people are resocialized more easily; they have remissions because they have facilities which help them to adapt, their environment is more stimulating, and interpersonal relationships are not severed completely. At professional and clerical levels the incidence of criminal insanity is extremely low.

It is possible to make only very tentative deductions from figures dealing with religious denominations of patients. The incidence of criminal insanity among Protestant denominations other than the Church of England is much lower than the percentage in the population would indicate; on the other hand, it is considerably higher in the case of Roman Catholics. It is possible that these figures again reflect social or employment status within the various church populations (working-class Roman Catholics, middle-class Protestants, etc.).

To comment on the extremely high rate of unmarried persons in this series, it may be explained by the high incidence of schizophrenics with their low sex drive and general withdrawal from society, and the low marriage rate amongst mental defectives.

The incidence of mental illness amongst migrants is slightly greater than with Australian-born; a new environment, language barriers and overt antagonism by the host population may engender paranoid states and precipitate manic or depressive breakdowns.

Conclusion.

To sum up, the problem of criminal insanity, particularly involving major offences, is closely linked with the concept one may conveniently call "control". Diminished ego-functioning of considerable magnitude will produce loss of control over instinctual drives, impaired judgement and imperfect contact with reality. Psychoanalytically, the factors bringing about this state of affairs can be summarized as either a malignantly hypertrophied or rudimentary super-ego institution, in the case of depressives and psychopaths, or a disorganized and regressed ego in the case of schizophrenics. Be that as it may, we still lack insight into the dynamics of control. What keeps psychotics or defectives so to say suspended frictionless in the community, able to function adequately, and what precipitates their breakdown and consequent loss of control? We have no tests, psychological or otherwise, to measure the amount of control present in a given case. We cannot yet predict in order to avoid antisocial acts in mentally ill people. Surely our next line of investigation must lie in that direction. Any positive results from such an inquiry would greatly assist the psychiatrist, who is constantly required to give his opinion on matters dealing with the safety of the community and the freedom of the individual. Errors of judgement may occur; at times it

may be impossible to predict with any degree of certainty. But society, which is prepared to accept considerable risks in matters such as road accidents and experimentation with nuclear fission, can be expected to accept certain calculated risks in connexion with the criminal insane. At the same time, we must make every effort to perfect our techniques of calculation in the interests of the individual who is entrusted to our care, as well as for the protection of society.

Summary.

1. Medico-legal problems pertaining to criminal insanity are outlined. A practical approach to offences committed by the mentally ill tends to replace former moralistic attitudes.
2. Legal mechanisms of the admission of criminal insane persons in Victoria are described.
3. The results of an analysis of 131 case histories of criminal insane patients in two Victorian mental hospitals are tabulated.
4. The findings are discussed in some detail, and recommendations for further investigations are made.

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AN EVALUATION OF DRUGS USED FOR ORAL PREMEDICATION OF CHILDREN.

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ORAL PREMEDICATION has certain advantages over parenteral premedication. Many a child fears injections, and if a group of children is to be prepared for operation the cries and struggles of such a child increase the apprehension of the remaining children. Successful oral premedication results in a less suspicious child and one who will more readily accept a thiopentone induction of anaesthesia.

Modern paediatric anaesthetic practice is to induce anaesthesia by the intravenous administration of thiopentone, rather than by inhalational techniques, and to perform

venipuncture in these small patients some degree of cooperation is necessary. As a result, there is a swing away from deep pre-operative basal narcosis towards lighter pre-operative sedation. This lighter pre-operative state also helps avoid the post-operative confusion and delirium sometimes associated with heavy premedication.

Having been favourably impressed by a new drug for oral premedication, trimeprazine tartrate, it was decided to compare this drug with other apparently satisfactory drugs. The drugs chosen for comparison were: methylpentynol ("Oblivon") and hyoscine hydrobromide; trimeprazine tartrate ("Vallergran") and hyoscine hydrobromide; pethidine hydrochloride and hyoscine hydrobromide; and trimeprazine tartrate, pethidine hydrochloride and hyoscine hydrobromide. These drugs were chosen because of the difference of opinion as to their effectiveness and freedom from side effects. The combination of trimeprazine, pethidine and hyoscine was chosen, to test whether the addition of an analgesic drug to the trimeprazine mixture reduced the incidence of post-operative restlessness.

Method.

To avoid observer bias as far as possible, the "double blind" principle was employed. Four mixtures were prepared, and each was prescribed at random to 100 children. The mixtures were indistinguishable in appearance and taste, and the composition of each mixture was unknown to either the prescriber or the observer and was revealed by the pharmacist only at the conclusion of the series. The mixtures contained what were judged to be equipotent doses of the drugs.

The dose (Table I) of trimeprazine and hyoscine was

TABLE I.
Dosage of Drugs.

| Drugs. | Dose per Drachm of Mixture. | Prescribing Instructions. |
|---------------------------------------|--|---|
| Pethidine and hyoscine. | Pethidine 15 mg., hyoscine 0.18 mg. (1/360 grain). | One drachm per stone of body weight, by mouth, one and a half to three hours pre-operatively; children aged 2 to 12 years: maximum dose, 6 drachms. |
| Trimeprazine, pethidine and hyoscine. | Trimeprazine 7.5 mg., pethidine 7.5 mg., hyoscine 0.18 mg. (1/360 grain). | |
| Methylpentynol and hyoscine. | Methylpentynol 175 mg., hyoscine 0.18 mg. (1/360 grain). | |
| Trimeprazine and hyoscine. | Trimeprazine 7.5 mg., hyoscine 0.18 mg. (1/360 grain). | |

based on previous experience (Gunner and Fox, 1960); the dose of pethidine was that suggested by Root (1959); the dose of methylpentynol was slightly less than that used by some authorities (Doughty, 1959), but approximated a dosage previously found satisfactory. Hyoscine was used in preference to atropine because of its sedative, amnesic and antiemetic properties, and because it was less likely to cause tachycardia.

Dosage was by body weight only, without regard to age, obesity or psychological make-up. All the children were from the same ward and scheduled for ear, nose or throat procedures; all were between the ages of two and twelve years.

Observations were made of pre-operative vomiting of the mixture, sedation, drying of secretions, post-operative vomiting and post-operative restlessness. These observations were then submitted to statistical analysis.

Results.

Pre-Operative Vomiting.

The number of children who vomited their premedication is shown in Table II. From the results, it is evident that no one mixture is less likely to be vomited prior to induction of anaesthesia.

Pre-Operative Sedation.

The quality of pre-operative sedation was judged by the child's behaviour during induction of anaesthesia (Table III).

The premedication was judged to be good if the patient needed no or minimal reassurance; fair if reassurance was necessary, but the child was able to be reassured; poor if the child was unable to be reassured. The technique of induction of anaesthesia was either by the intravenous administration of thiopentone, or by the inhalation of nitrous oxide or, very occasionally, ethyl chloride. Intuba-

TABLE II.
Pre-Operative Vomiting of Premedication.

| Drugs. | Pre-Operative Vomiting. | |
|---|-------------------------|-----|
| | Yes. | No. |
| Pethidine and hyoscine | 3 | 97 |
| Trimeprazine, pethidine and hyoscine .. | 4 | 96 |
| Methylpentynol and hyoscine | 2 | 98 |
| Trimeprazine and hyoscine | 3 | 97 |

tion was carried out, and anaesthesia was maintained by nitrous oxide and ether. The choice of induction and maintenance of anaesthesia depended more on the anaesthetic resident's experience and stage of training than on any other factor. The inexperience or otherwise of induction of anaesthesia must influence the child's demeanour during induction, and so affect the evaluation of the pre-

TABLE III.
Behaviour of Children During Induction of Anaesthesia.

| Drug. | Sedation. | | |
|--|-----------|-------|-------|
| | Good. | Fair. | Poor. |
| Pethidine and hyoscine | 40 | 29 | 22 |
| Trimeprazine, pethidine and hyoscine | 50 | 24 | 17 |
| Methylpentynol and hyoscine | 69 | 19 | 12 |
| Trimeprazine and hyoscine | 69 | 21 | 10 |

medication. However, because the object of the inquiry was to determine the most satisfactory premedication for existing conditions, it was not considered logical to limit the observations to any one technique or anaesthetist.

By scoring 2 points for good, 1 point for fair and 0 point for poor sedation, it was possible to calculate a mean score and standard deviation for each drug and so evaluate the drugs. Statistical evaluation showed that methylpentynol-hyoscine was highly significantly superior to pethidine-hyoscine ($P < 0.01$), and trimeprazine-hyoscine was also highly significantly superior to pethidine-hyoscine ($P < 0.01$). It was not possible to distinguish further between the drugs.

Drying of Secretions.

A high proportion of all the drugs gave adequate drying of secretions (Table IV).

Drying was considered to be inadequate if mucus interfered with the induction or maintenance of anaesthesia. Despite the antisialogogue action of pethidine, there was no statistically significant difference between the drug mixtures.

Post-Operative Vomiting.

The majority of children in this trial underwent adenotonsillectomy, and the incidence of post-operative vomiting was high, perhaps as much from the swallowed blood as

from the premedication and anaesthetic (Table V). However, as the commonest operation in childhood is adeno-tonsillectomy, it was thought reasonable to judge post-operative vomiting against this background. Vomiting was recorded as (i) nil, (ii) slight if the patient vomited

TABLE IV.
Comparison of Antisialagogue Activity.

| Drug. | Drying. | |
|---|-----------|-------------|
| | Adequate. | Inadequate. |
| Pethidine and hyoscine .. | 95 | 5 |
| Trimeprazine, pethidine and hyoscine .. | 97 | 3 |
| Methylpentynol and hyoscine .. | 95 | 5 |
| Trimeprazine and hyoscine .. | 98 | 2 |

only once or twice while regaining consciousness, or (iii) marked, if vomiting was more prolonged. By calculating a mean score and standard deviation, it was possible to analyse these observations statistically.

TABLE V.
Comparison of Post-Operative Vomiting.

| Drug. | Post-Operative Vomiting. | | |
|---|--------------------------|---------|---------|
| | Nil. | Slight. | Marked. |
| Pethidine and hyoscine .. | 31 | 44 | 25 |
| Trimeprazine, pethidine and hyoscine .. | 48 | 45 | 7 |
| Methylpentynol and hyoscine .. | 44 | 44 | 12 |
| Trimeprazine and hyoscine .. | 51 | 44 | 5 |

The pethidine-hyoscine combination was shown to be inferior to trimeprazine-hyoscine ($P < 0.01$, highly significant), trimeprazine-pethidine-hyoscine ($P < 0.01$, highly significant), and methylpentynol-hyoscine ($P < 0.05$, sig-

TABLE VI.
Post-Operative Restlessness.

| Drug. | Post-Operative Restlessness. | | | |
|---|------------------------------|---------|---------|----------|
| | Nil. | Slight. | Marked. | Extreme. |
| Pethidine and hyoscine .. | 63 | 24 | 11 | 2 |
| Trimeprazine, pethidine and hyoscine .. | 71 | 16 | 12 | 1 |
| Methylpentynol and hyoscine .. | 64 | 26 | 9 | 1 |
| Trimeprazine and hyoscine .. | 59 | 29 | 10 | 2 |

nificant) in relieving post-operative vomiting. However, it was not possible to distinguish further between the drugs.

Post-Operative Restlessness.

Post-operative pain is marked after adeno-tonsillectomy, and restlessness is not uncommon during the recovery phase. Restlessness was graded as (i) nil if restraint was not needed, (ii) slight if restraint was needed for a few minutes, (iii) marked if restlessness was more persistent, and (iv) extreme if the child was persistently violent and needing analgesics (Table VI).

No one mixture was superior to the others in relieving post-operative restlessness. The addition of pethidine to the trimeprazine mixture did not significantly alter the incidence of post-operative restlessness.

Cost of Mixtures.

The approximate cost of the active ingredients per fluid ounce of the mixtures is indicated in Table VII. This cost compares very favourably with other agents commonly used for oral premedication.

TABLE VII.
Cost of Active Ingredients of Mixtures.

| Mixture. | Cost in Pence per Fluid Ounce of Mixture. |
|---|---|
| Pethidine and hyoscine .. | 3 |
| Pethidine, trimeprazine and hyoscine .. | 15 |
| Methylpentynol and hyoscine .. | 17 |
| Trimeprazine and hyoscine .. | 14 |

Summary.

A comparison was made of drugs used for oral premedication of children. Under the conditions of the investigation, methylpentynol-hyoscine and trimeprazine-hyoscine mixtures give significantly better pre-operative sedation and caused less post-operative vomiting than a pethidine-hyoscine mixture. All drug mixtures caused adequate drying of secretions, and the incidence of post-operative restlessness was not significantly higher with trimeprazine than with other drugs; this incidence was not influenced by the addition of pethidine to the mixture.

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LIVER FAILURE IN LATE PREGNANCY: HYPERURICÆMIA AS AN EARLY SIGN IN ITS DETECTION.

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LIVER FAILURE in late pregnancy is an uncommon condition. It usually appears as a complication of severe pre-eclampsia and eclampsia, but also occurs as an acute illness associated with fulminant infective hepatitis (Dill, 1950) or those diseases apparently peculiar to pregnancy—the acute fatty liver of pregnancy (Sheehan, 1940; Moore, 1955; Ober and LeCompte, 1955) and "eclampsia without convulsions" (Reis and Bernick, 1944; Eton, 1956). The

extent of the liver lesions in patients who die from severe preeclampsia and eclampsia varies considerably from minimal periportal hemorrhage to acute massive necrosis with hemorrhage, and it would seem that some other factors apart from the severity of the preeclampsia influence the degree of liver damage.

Recently, at the Royal Hospital for Women, Sydney, there have been three cases of twin pregnancy in which liver failure developed either in association with or as part of a syndrome which was at first considered to be mild preeclampsia. In each case an elevated serum uric acid level was the earliest warning sign of serious illness.

The frequent association of a raised serum uric acid level with preeclampsia has been recognized for many years (Stander and Cadden, 1934; Lancet and Fisher, 1956). However, its estimation for prognosis has fallen into disrepute, because in some cases the degree of uricemia does not reflect the severity of the condition. In mild preeclampsia no effect on uric acid levels may be found, and in severe cases other signs of the severity of the condition may be evident before the uric acid levels are altered significantly.

Recent tracer studies of uric acid metabolism (Seitchik, 1956, 1958) point out the limitations of the serum estimation—that it is only a crude index of the uric acid pool, reflecting not only the rate of urate production, but also the rate of uricolysis and renal function in respect to urate excretion. While these factors require further study, it is none the less of considerable practical importance that, in some cases, the serum uric acid levels may rise to an extent to warn the obstetrician of impending danger before other clinical features appear. This occurred in each of the three cases described below.

Reports of Cases.

CASE I.—Miss A., aged 26 years, first attended the antenatal clinic on February 14, 1957, when she was about 28 weeks pregnant, the exact date of her last menstrual period being uncertain. She had had one previous miscarriage in 1956, but no serious illness or operation. There was a degree of hydramnios, and multiple pregnancy was suspected. The blood pressure was 110/70 mm. of mercury, and the urine contained no abnormal constituents. Hemoglobin estimation revealed anemia (hemoglobin value 9.7 grammes per 100 ml.) which responded to iron, and one month later the hemoglobin value was 11.8 grammes per 100 ml. The blood group was O, Rh-positive. The patient attended weekly and, apart from some hydramnios and a weight gain of 9 lb. in 5 weeks, showed no abnormality until, on March 23, when she was 34 weeks pregnant, her blood pressure rose to 130/100 mm. of mercury; there was now slight edema. With admission to hospital and bed rest her blood pressure fell quickly to 120/85 mm. of mercury, and remained at about this level for the next three weeks. The slight pretibial edema also disappeared. The patient was kept in bed except for toilet privileges, and given iron, calcium and vitamin supplements.

Serum uric acid estimations were carried out at weekly intervals (Table I); the level rose steadily from 5.2 mg. per 100 ml., until on April 9 it was 8.9 mg. per 100 ml., and the blood urea level was 50 mg. per 100 ml. At this time the blood pressure was 130/95 mm. of mercury and there was no proteinuria; the latter appeared for the first time on April 21. Van Slyke's urea clearance test on April 26 showed considerable impairment (48% of average normal), and the serum uric acid level had increased to 10.8 mg. per 100 ml. The blood pressure rose, on one occasion being 150/105 mm. of mercury. There were signs of the onset of labour, but these disappeared. The patient's general condition remained stationary.

On May 2, the serum uric acid level rose further to 14.4 mg. per 100 ml., and in view of this, induction of labour by stripping of membranes with intermittent "Pitocin" administration was carried out. On May 3, as labour was not established, a "Pitocin" drip infusion was begun, and at 12.30 p.m. the membranes ruptured. The liquor was meconium-stained, and vaginal examination revealed that the breech of the first twin was presenting and the cervix was dilated to admit three or four fingers. At 10.30 p.m. that evening the patient developed a temperature of 104° F., and after vaginal and urine specimens had been taken for culture, she was given penicillin (500,000 units) and streptomycin (0.5 gramme) every six hours. Culture of the vaginal swabbing revealed a heavy growth

of *Bacterium coli*. At 11.30 p.m., in view of slow progress in the second stage of labour, breech extraction of the first twin with forceps delivery of the second twin was performed under ether anaesthesia. The first twin was a male weighing 6 lb. 14.5 oz. with asphyxia livida, from which he recovered. The second infant was a stillborn macerated male weighing 5 lb. The third stage of labour was normal.

TABLE I.
Serum Uric Acid and Urea Investigations in Case I.¹

| Date. | Serum Uric Acid Level. (Milligrammes per 100 ML.) | Blood Urea Level. (Milligrammes per 100 ML.) |
|---------|--|---|
| 22.3.57 | 5.2 | 20 |
| 28.3.57 | 6.0 | — |
| 2.4.57 | 7.7 | — |
| 3.4.57 | 5.5 | — |
| 9.4.57 | 8.9 | 50 |
| 15.4.57 | 7.6 | 56 |
| 26.4.57 | 10.8 | 89 |
| 2.5.57 | 14.4 | 107 |
| 4.5.57 | 15.3 | 106 |

¹ The uric acid estimations were performed by the method of Folin and Wu as modified by Brown (1945). With this method, close agreement was obtained with a sample of serum ("Chemtrol", issued by the Clinton Laboratories, Los Angeles U.S.A.) containing a known quantity of uric acid.

After delivery, the patient developed a cyanotic tinge; her pulse rate was rapid (140 per minute) and her blood pressure showed fluctuations between 115/90 and 150/100 mm. of mercury. A slow blood transfusion was commenced, and digoxin was given intravenously. At 7 a.m. on May 4 the patient complained of pain in the anterior part of the chest, and of headache. Her blood pressure was 170/120 mm. of mercury. A catheter specimen of urine contained "one-eighth" albumin. There was still a cyanotic tinge of the head, neck and upper limbs. At this time there was no jaundice, but the liver was acutely tender. By 10.45 a.m., the patient was clinically jaundiced; her serum bilirubin content was 9.7 mg. per 100 ml. and hypokalaemia was present (1.2 mEq./l.). At 2.30 p.m. the deep reflexes of the lower limbs were absent and the patient's condition deteriorated quickly. She became confused and disorientated and developed a fine tremor of the hands with some twitching. There was terminal bradycardia with coma, and the patient died at 1.40 a.m. on May 5.

The autopsy was performed eight hours after death. The liver (weight 2349 grammes) was the site of extensive pathological lesions, showing numerous large and small subcapsular hemorrhages involving both lobes; its cut surface was of a mottled dark-red and brownish colour. The uterus, measuring 12.5 cm. in length by 8.5 cm. in breadth, showed the normal raw placental site; there was no evidence of intramural hemorrhage. Both ovaries, the right measuring 4.5 by 3.0 by 1.4 cm. and the left 4.5 by 3.0 by 1.0 cm., were hemorrhagic. The placenta, measuring 19 by 22 cm., had two umbilical cords attached to it. The arrangement of the membranes indicated a dichorionic origin of the twins. No infarcts were observed. The spleen (194 grammes) and the kidneys were slightly enlarged, the latter weighing 180 and 178 grammes respectively. The remaining organs presented no unusual macroscopic appearances. The brain showed no evidence of hemorrhage. The pituitary gland weighed 0.87 gramme. The thyroid and four parathyroid glands were of normal size, as were the pancreas (81.5 grammes) and adrenals.

Microscopic examination of the liver showed a variable picture. In the less severely affected areas there were localized fibrino-hemorrhagic foci of variable size confined almost entirely to a periportal distribution. In other areas widespread necrosis of liver cells had occurred. However, even in the completely necrotic areas, localized foci of periportal hemorrhage with actual disintegration of parenchyma could still be clearly discerned. The fibrino-hemorrhagic areas contained an occasional polymorph. However, inflammatory cell infiltration of any degree was conspicuous by its absence. Close by severely damaged parts there were areas of liver parenchyma in which no pathological lesions were microscopically visible. Fatty infiltration was absent in all areas. An occasional vein of medium size contained a thrombus; however, a search of several sections was required to demonstrate one vessel so affected.

As observed by Himsworth (1950) in the case of acute liver necrosis in rats, there was frequently a sharp line of demarcation between viable and necrotic parenchyma. As in Himsworth's Figure 20 (page 38), this sharp boundary tended to traverse right through rather than zig-zag round individual lobules. At times such lobules on this boundary line were bisected through their central veins. On one side the liver cells were necrotic, and on the other they appeared histologically indistinguishable from living cells, except for a narrow dividing zone about two columns thick, in which the cells became increasingly smaller and their cytoplasm more ill-defined. In the necrotic areas the liver cells had shrunk away from the fine fibrillary walls of the sinuses. The latter were filled with increased amounts of blood, as compared with those on the undamaged side.

Although in some parts of the necrotic areas nuclei had lost their staining intensity (karyolysis), the vast majority seen even deep within such zones showed little visible abnormality when compared with those in apparently viable areas of parenchyma. Degeneration by karyorrhexis or pyknosis was not present. Deep within the necrotic areas there were occasional shrunken cells showing intracytoplasmic vacuoles, but this was not a prominent feature.

In a random section of the right lung there was, in relation to a venule and a bronchiole, a circular focus of decidual tissue 1.0 mm. in diameter, in the centre of which was a cavity partly filled with macrophages. At its periphery where it abutted on the venule, its cells showed all gradations, from the normal cells comprising the wall of the vein to large, pale, swollen cells indistinguishable from decidual cells; otherwise sections of the lungs showed no unusual features.

The spleen was markedly congested.

In the kidneys there was a mild degree of cloudy swelling of the proximal convoluted tubules. Their lumina and those of the collecting tubules contained a moderate amount of amorphous eosinophilic material, as did the capsular space of the glomeruli. The glomeruli were relatively avascular, and did not show the changes occurring in eclampsia as described by Sheehan (1950). There was no increase of interstitial connective tissue and no infiltration with chronic inflammatory cells.

The pituitary gland showed a preponderance of oxyphil cells in its anterior portion.

In both adrenals there was a moderate increase in the thickness of the zona fasciculata. The individual cells were increased in size and contained numerous vacuoles of variable size. The zona glomerulosa was reduced in size, being encroached on by the fasciculata. The zona reticularis showed no unusual features.

The ovaries contained numerous small follicular cysts, and there was confirmation of the presence of extensive interstitial hemorrhage.

The thyroid gland showed a mixed picture of activity, with acini lined by high columnar epithelium and a small amount of colloid with a scalloped edge facing the free surface of the epithelial cells, and inactivity, with enlarged vesicles well filled with deeply staining colloid and lined by low cubical epithelium. The over-all histological picture suggested considerable functional activity.

There was some residual thymus tissue.

The four parathyroid glands showed no evidence of hyperplasia as judged by size and the amount of fat cells dispersed within the parenchyma. The predominant cell was the chief or principal cell. A considerable number of cells were almost devoid of cytoplasm, having a water-clear appearance, although only a few showed the ballooning of the typical *Wasserschle* cell. Oxyphil cells were present singly and, rarely, in small groups of four to ten cells, the latter usually being at the periphery of the glands. Each gland was well vascularized, with numerous open capillaries filled with erythrocytes.

The final stage of this illness was clearly one of acute massive necrosis of the liver, with the clinical features of acute liver failure. While the impairment of urate excretion was considerable, the renal damage at autopsy was histologically minimal. The extra foetal requirements of the twin pregnancy, the impairment of digestion and appetite occasioned by the abdominal distension with twins and hydramnios, and the probable dietary deficiency (as the patient was unmarried and anemic when first examined) were factors present in this case making the liver more liable to injury. The twitchings seen just

before death were considered as terminal features of hepatic coma, and not as eclamptic manifestations.

CASE II.—Mrs. B., aged 31 years, attended the ante-natal clinic on January 29, 1958, when 16 weeks pregnant. Her last menstrual period had commenced on October 16, 1957, her menstrual cycle had been regular and the expected date of delivery was July 26, 1958. She gave a history of rheumatic fever, and had signs of mitral stenosis with minimal cardiac disability. She had had four previous pregnancies. Her first pregnancy in 1952 had been complicated by pyelitis and premature labour, the second in 1955 had proceeded normally to term, and the third in 1956 had again been complicated by pyelitis and premature labour at 32 weeks. On this last occasion, foetal distress developed, possibly owing to entanglement of the umbilical cord around the neck, and after a short labour the mother was delivered of a living infant weighing 4 lb. 14 oz. In 1957, she was delivered of a stillborn macerated foetus at about 36 weeks. The pregnancy had apparently been normal until movements ceased two weeks before delivery. No cause could be found for the intrauterine death. Her blood group was O, Rh-positive.

During the present pregnancy, anaemia (haemoglobin value 9.9 grammes per 100 ml.) responded to iron therapy, and she was well until, at 32 weeks, her blood pressure, which had previously been about 130/70 mm. of mercury, rose to 140/95 mm. of mercury, and she was admitted to hospital.

While she was in hospital, her blood pressure remained at about 140/95 mm. of mercury. There was minimal oedema, and no albuminuria. She had no headaches, and no visual disturbances, and the optic fundi were normal until the day of delivery. As a routine procedure the serum uric acid level was estimated and found to be elevated—on May 9 it was 7.1 mg. per 100 ml., and on May 19 it was 6.8 mg. per 100 ml. During this time the patient was confined to bed except for toilet privileges, and was given iron and a phenobarbitone sedative mixture. At this time, she complained of vague soreness in the right hypochondrium; this was present for three weeks before delivery, and was considered initially to be due to uterine and abdominal distension.

On May 26, when she was 35 weeks pregnant, a progress serum uric acid estimation was made, and the level was reported as 12.4 mg. per 100 ml. The patient's general condition was the same—her blood pressure was 140/90 mm. of mercury, there was no oedema and the urine contained no protein. The following day the patient noticed that the soreness in the right hypochondrium was more marked and she became nauseated.

On May 29, the serum uric acid level was 15.9 mg. per 100 ml. The soreness and tenderness in the right hypochondrium were now considered to be due to liver distension. The patient appeared drowsy. Although the blood pressure was still only 130/100 mm. of mercury and there was no oedema or proteinuria, surgical induction of labour by rupture of the membranes was carried out, and she was quickly delivered of two female infants weighing 5 lb. 2 oz. and 3 lb. 13.5 oz. respectively; they survived. There was no foetal distress. The placenta was dichorionic.

After delivery, the liver tenderness became obvious, and bile, urobilinogen and some protein appeared in the urine. The patient remained drowsy for 24 hours, although no sedation had been given during labour. Her appetite remained poor for three days, and the liver tenderness gradually disappeared. Tremor of the hands was noticed on the second day of the puerperium, but this was only transitory. The liver was at no time palpably enlarged. Liver function tests showed some degree of hepatocellular biliary obstruction (see Table II), and the results did not return to normal until after two weeks.

During the puerperium, estimations of the 24-hour excretion of uric acid showed markedly raised values (Table III).

An assessment of the patient's diet in late pregnancy was made by the hospital dietitian, who found that, although she had been advised to have protective foods, the patient had had a diet containing very little milk, only two eggs per week and small quantities of meat. Her diet was deficient in protein (45 grammes per day) as well as in minerals and vitamins (see Table IV).

The clinical and biochemical picture in this case is similar to that in the cases described by Moore (1955), in which the patients died in hepatic coma with acute fatty infiltration of the liver. Again in this case there was a history of dietary deficiency. The clinical onset

TABLE II.
Biochemical Investigations in Case II.

| Date. | Serum Uric Acid Level. (Milligrammes per 100 ml.) | Blood Urea Level. (Milligrammes per 100 ml.) | Serum Protein Content. (Milligrammes per 100 ml.) | | | Serum Alkaline Phosphatase Content. (King-Armstrong Units.) | Thymol Turbidity. (Units.) | Zinc Sulphate Turbidity. (Units.) | Serum Bilirubin Level. (Milligrammes per 100 ml.) |
|---------|--|---|--|----------|-----------|--|-------------------------------|--------------------------------------|--|
| | | | Total. | Albumin. | Globulin. | | | | |
| 9.5.58 | 7.1 | 16 | — | — | — | — | — | — | — |
| 19.5.58 | 6.8 | — | — | — | — | — | — | — | — |
| 26.5.58 | 12.4 | — | — | — | — | — | — | — | — |
| 29.5.58 | 15.9 | 55 | — | — | — | — | — | — | — |
| 30.5.58 | 16.5 | 67 | 6.8 | 2.4 | 4.4 | 33 | 2 | 3 | 1.0 |
| 31.5.58 | 17.0 | 45 | — | — | — | — | — | — | — |
| 2.6.58 | 14.0 | 35 | 5.5 | 2.3 | 3.2 | 25 | 2 | 4 | — |
| 4.6.58 | 9.9 | 30 | — | — | — | — | — | — | — |
| 11.6.58 | 6.6 | 33 | 5.7 | 2.8 | 2.9 | 15 | — | — | — |
| 2.7.58 | 5.3 | — | 7.8 | 4.4 | 3.4 | 16 | 3 | 7 | 0.6 |
| 17.7.58 | 5.3 | — | — | — | — | 11 | 2 | 5 | 0.4 |

of nausea with liver tenderness, going on to drowsiness and stupor with tremor of the hands, was typical of incipient hepatic coma. The biochemical picture was that of hepatocellular biliary obstruction, with bile and urobilinogen in the urine, a raised serum alkaline phosphatase level and a normal response to the thymol turbidity test.

The serum alkaline phosphatase level was regarded with some suspicion, in view of the normal elevation in late pregnancy (Ebbs et alii, 1941), and particularly as this was a multiple pregnancy (Ebbs and Scott, 1940). However, with bile and urobilinogen in the urine and clinical evidence of hepatic coma, the elevated serum alkaline phosphatase level was considered indicative of liver dysfunction.

TABLE III.
Urinary Uric Acid Estimations after Delivery in Case II.

| Date. | Volume of Urine. (Millilitres.) | Total Uric Acid Content. (Grammes.) | Protein Content. (Grammes.) |
|---------|------------------------------------|--|--------------------------------|
| 29.5.58 | 770 | 1.3 | 1.2 |
| 30.5.58 | 820 | 1.4 | 0.16 |
| 2.6.58 | 1450 | 3.9 | 0.22 |
| 4.6.58 | 950 | 2.4 | — |
| 7.6.58 | (Incomplete) | 0.5 | — |
| 8.6.58 | 845 | 0.7 | — |
| 21.8.58 | 1240 | 0.5 | — |

CASE III.—Mrs. C., aged 26 years, was examined for the first time when she was admitted to hospital on August 15, 1958, as an emergency patient, six weeks pregnant and with abortion threatening. Her last menstrual period had commenced on June 27, her menstrual cycle had been regular and the expected date of delivery was April 7, 1959. Her previous obstetric history was that, after an early abortion in 1954, her first full-time pregnancy in 1955 had been complicated by preeclamptic toxemia and post-partum hemorrhage. Pregnancies in 1956 and 1957 had been normal. She had had no serious illnesses or operations.

After six days' rest in hospital, the patient was discharged to the out-patient department. However, she did not attend, and was readmitted again as an emergency patient, in threatened premature labour, when 29 weeks pregnant. Multiple pregnancy was detected. She had become anemic since her first admission; the hemoglobin value had fallen from 12.2 grammes per 100 ml. on August 15, 1958, to 9.0 grammes per 100 ml. on January 22, 1959, and there was mild polychromasia. Her blood group was O, Rh-negative; no agglutinins were present. The anaemia diminished on iron therapy. On this occasion, she was discharged after three days. She attended the ante-natal clinic, and the pregnancy progressed normally until, on March 3, when she was 35 weeks pregnant, her blood pressure rose from 130/85 to 140/90 mm. of mercury, and she was admitted to hospital.

Her blood pressure rose slightly, and remained at about 145/100 mm. of mercury during the 10 days before delivery.

There was minimal oedema, and no proteinuria. A serum uric acid estimation performed on her previous admission to hospital had shown a slightly elevated level—6.8 mg. per 100 ml. After her third admission to hospital, a progressive rise in the serum uric acid level occurred (Table V). In view of our previous experience, symptoms and signs of liver dysfunction were sought. There was no abdominal pain over the liver, but slight tenderness was elicited on March 14, 11 days after her admission. There were no signs of drowsiness and no other clinical evidence of liver failure. However, examination of the urine revealed the presence of bile and urobilinogen, and liver function tests showed a pattern similar to that in Case II (raised serum alkaline phosphatase level and normal thymol turbidity—see Table V). Surgical induction of labour by stripping of the membranes with intermittent intramuscular injection of "Pitocin" was performed, and five

TABLE IV.
Estimated Daily Dietary Intake in Cases II and III.

| Factor. | Case II. | Case III. | Recommended Allowances. |
|------------------------------|-------------------------|-----------------|-------------------------|
| Calories | 3000 | 1600 | 2400 |
| Protein (grammes) | 45 | 40 | 85 |
| Calcium (grammes) | 0.5 | 0.5 | 1.5 |
| Iron (milligrammes) | Deficient | Very deficient. | 15 |
| Ascorbic acid (milligrammes) | Deficient. | Deficient. | 100 |
| Thiamine (milligrammes) | Deficient. | Deficient. | 1.5 |
| Riboflavin (milligrammes) | Probably just adequate. | — | 2.5 |

and a half hours later, on March 14, female binovular twins, weighing 5 lb. 1 oz. and 6 lb. 0.5 oz. respectively, were delivered. There was no fetal distress. After delivery the liver remained tender, and the results of liver function tests did not return to normal until after two weeks. Lactation was suppressed. On March 20, liver biopsy was performed by Dr. J. Rankin, from the Royal Prince Alfred Hospital Gastroenterology Unit. This showed a few isolated foci of fatty change, but no other abnormality.

The dietitian reported that, although the patient might be exaggerating her financial difficulties for social reasons, her diet was grossly deficient in all essentials (Table IV). During the first three months of pregnancy she ate very little, as she felt ill and vomited frequently. The patient said that the only time she ate well was when she was in hospital for rest, during the fifth month of the pregnancy. At home she had only bread and jam and tea for lunch, rarely had milk and disliked cheese, liver and kidney. Her protein intake was about 40 grammes per day.

In this case, the syndrome was detected in its earliest phase by the biochemical abnormality and in particular the serum uric acid changes. The liver biopsy on the sixth day of the puerperium showed minimal fatty change, being confined to an occasional small group of cells. However, the presence of fatty change at this time suggests that this might have been more marked one week earlier, at the time of delivery.

TABLE V.
Biochemical Investigations in Case III.

| Date. | Serum Uric Acid Level. (Milligrammes per 100 ML.) | Blood Urea Level. (Milligrammes per 100 ML.) | Serum Alkaline Phosphatase Level. (King-Armstrong Units.) | Thymol Turbidity. (Units.) | Zinc Sulphate Turbidity. (Units.) | Serum G.O.T. ¹ Level. (Units.) | Serum Bilirubin Level. (Milligrammes per 100 ML.) |
|---------|--|---|--|-------------------------------|--------------------------------------|--|--|
| 19.1.59 | 6.8 | 15 | — | — | — | — | — |
| 5.3.59 | 7.4 | 19 | — | — | — | — | — |
| 10.3.59 | 10.3 | 21 | — | — | — | — | — |
| 14.3.59 | 11.0 | — | 30 | 1 | 2 | 24 | 0.9 |
| 16.3.59 | 10.5 | 20 | 23 | 1 | 2 | 22 | Direct positive |
| 18.3.59 | 8.3 | — | — | — | — | — | 0.6 |
| 20.3.59 | 6.9 | — | — | — | — | — | — |
| 23.3.59 | 7.7 | — | — | — | — | — | — |
| 25.3.59 | 7.3 | — | 17 | — | — | — | — |

¹ Serum glutamic oxalacetic transaminase.

Discussion.

The features common to these three cases are the elevation of the serum uric acid level, multiple pregnancy and preeclampsia. A poor diet, particularly in protein, was found in the two cases in which it could be investigated, and was suspected in the third case, in view of the patient's social background and the fact that she was anemic.

The clinical picture, which developed at about the thirty-fourth week of pregnancy in all three cases, was that of a short history of anorexia, nausea and vomiting with tenderness over the liver. In the two more serious cases, symptoms and signs of hepatic coma developed, and in one the illness terminated fatally.

The biochemical picture of the liver failure in the fatal case is unfortunately incomplete; but in both the other cases there was evidence of a hepatocellular obstructive lesion without extensive parenchymal damage—raised serum bilirubin level with a direct positive van den Bergh reaction, bile and urobilinogen in the urine, raised serum alkaline phosphatase level and normal thymol turbidity, zinc sulphate turbidity and glutamic oxalacetic transaminase activity.

There are certain phenomena peculiar to late pregnancy which indicate a deviation from normal liver function and alter adversely the ability of liver cells to recover when submitted to injury. These are a depletion of the glycogen content of the liver, some alteration of the fat metabolism with increase in fatty acids in the blood-stream (Ingerslev and Tellum, 1945), and the development of clinical features associated with the high blood oestrogen levels—a tendency to pruritus, and the development of spider naevi and liver palms, presumably owing to failure of the liver to detoxicate the increased amounts produced by the placenta. There is also experimental evidence that in pregnancy in rats there is a loss of glycogen, a slight rise in the deoxyribonucleic acid phosphorus content and a considerable rise in the ribonucleic acid phosphorus content, and that these changes are independent of the protein content of the diet (Campbell and Kosterlitz, 1949). At later stages of pregnancy, the deoxyribonucleic acid phosphorus content does not keep pace with the increase in the weight of the uterine contents.

Again, in late pregnancy indigestion is common, particularly with overdistension of the uterus occasioned by multiple pregnancy and hydramnios, and the diet is often limited to the more easily digested carbohydrate type of food. Considerable amounts of protein, minerals and vitamins are required for the development of the foetus in a single pregnancy, and this becomes more important in multiple pregnancy, particularly in the last trimester. While liver biopsies in normal pregnancy have shown no histological abnormality, the liver, like many other tissues, is in high metabolic activity in late pregnancy, more easily depleted of essential protective substances and more liable to injury under stress. When anaemia is associated with severe nutritional deficiency, liver

damage, or at least dysfunction, is common. Woodruff (1951) carried out liver biopsies on 24 pregnant women with severe anaemia and nutritional deficiencies, and found pale cytoplasm and some increase in fibrous tissue in the portal tracts. In seven patients there was fatty infiltration, mainly periportal in distribution, and this was considered to be due to protein malnutrition. He found that this was more common in twin pregnancies, almost certainly owing to the extra nutritional demands of the fetuses. Silvera and Jelliffe (1952) followed this up by examination of the livers of infants who died within a few hours of being born of malnourished mothers. They found that in several instances the infant's liver was grossly infiltrated with fat and even contained an increased amount of fibrous tissue. A nutritional cause was the only likely explanation. Whilst there normally is fat in the liver of new-born and still-born infants (Dorkin and Weinberg, 1949), in the cases reported by Silvera and Jelliffe there was gross fatty infiltration.

When patients develop preeclampsia, there is generalized vascular spasm, which presumably includes the hepatic artery. The findings on liver biopsy in preeclampsia (Ingerslev and Tellum, 1945; Antia *et alii*, 1958) are essentially normal. While the picture in eclampsia is in some cases normal, in other cases it shows areas of necrosis with or without periportal haemorrhage, or merely periportal haemorrhage alone. The degree of proteinuria, the level of hypertension or the eventual outcome for the patient does not seem to determine the cases of eclampsia in which there will be pathological effects in the liver. The patients with gross massive necrosis of the liver obviously die of hepatic failure, and it may be that in these cases either a more severe degree of vascular spasm occurs, or more probably, deficiency of certain protective substances impairs enzymatic activity to a greater degree than in the cases in which liver biopsy has shown a normal pattern or merely periportal haemorrhage without necrosis.

Histologically, there are few ways in which the liver may manifest injury, whether the harmful agent is anoxia, toxins or nutritional deficiency. These are by cloudy swelling, fatty infiltration or necrosis, either focal or massive, with or without cellular infiltration.

The main severe lesions in late pregnancy are, first, the centrilobular necrosis associated with the more virulent form of infective hepatitis, secondly, the acute massive necrosis with periportal haemorrhage seen in some cases of eclampsia and "eclampsia without convulsions", and thirdly, the acute fatty liver, described by Sheehan (1940) and more recently by Moore (1955) and by Ober and LeCompte (1955). The two last-mentioned lesions are peculiar to pregnancy.

The clinical features of fulminant infective hepatitis, eclampsia without convulsions and the acute fatty liver of pregnancy may resemble each other in many ways, and this has led to confusion in the literature. The series presented by Nixon *et alii* (1947) and by Dill (1950) would appear to include cases of infective hepatitis, acute fatty liver of pregnancy and indefinable liver necrosis.

The syndrome of acute fatty liver of pregnancy was first adequately described by Sheehan (1940), although Stander and Cadden (1934) and Cullinan (1936) described similar cases. Since then cases have been reported by Whitacre and Fang (1942), by Moore (1955, 1956) and by Ober and LeCompte (1955). It presents as an illness in late pregnancy with nausea, vomiting and tenderness in the right hypochondrium, going on to coma and jaundice, and terminating fatally after six to 10 days with all the features of hepatic coma. The fetus is often delivered still-born and macerated during the illness. In some cases, recovery occurs if delivery is effected by surgical induction of labour or Caesarean section. Moore (1955) describes hypoglycemia, hypokalemia and a hemorrhagic tendency as possible complications. It would appear that few of the non-fatal cases have been recognized.

Biochemically, the lesion is that of a hepatocellular obstruction. There are a raised serum alkaline phosphatase level, normal thymol turbidity, bilirubinemia and urobilinogen in the urine. Moore (1955) states that the faecal stercobilinogen content is reduced, although the faeces are rarely clay-coloured. The pathological picture is that of fine fatty infiltration of the liver, mainly centrilobular in distribution and without necrosis.

In many of the cases in the literature and in our series, nutritional deficiencies would be expected. There are three twin pregnancies in the 22 cases reported already in the literature (an incidence of twins higher than would be expected), and in these cases the extra foetal requirements would aggravate a nutritional deficiency. In some cases anemia is reported, and in others the condition occurred in unmarried girls, Negroes, and women with large families whose nutrition, once again, would be expected to be poor.

The lesion is almost certainly due to a breakdown in certain enzyme systems, as yet undetermined, in the liver and possibly elsewhere. If, for example, trans-methylation processes break down, failure of fat metabolism could lead to fatty infiltration in the liver, and a derangement of creatine metabolism in the uterus and elsewhere could result in an increase in non-protein nitrogen, urea and uric acid and the accumulation of ammonia and other toxic substances culminating in hepatic coma. This would explain many of the features of the clinical and biochemical picture.

Acute fatty liver of pregnancy is in some respects similar to the lesion found in twin lamb disease in sheep. The clinical and biochemical features are similar—the development of an acute illness in late pregnancy with failure to eat, signs similar to hepatic coma and the elevation of the blood non-protein nitrogen, ammonia and ketone levels (Groenewald *et alii*, 1941). However, as the sheep's liver has a different pattern of carbohydrate metabolism from that of the human, being dependent mainly on short-chain fatty acids rather than pyruvate to supply acetyl coenzyme A, the degree of fatty infiltration of the liver is very much more extensive. Gallagher (1959) has shown that there is a failure of enzymatic conversion of the long-chain fatty acids to the 2C units in sheep toxemia, and it would be of interest to determine whether there is a similar disturbance in this human "toxemia". However, at present, relatively large amounts of fresh liver are required for such studies, more than can be obtained by liver biopsy (post-mortem material is unsatisfactory for enzyme studies).

It is considered that Cases II and III are either early cases of the acute fatty liver of pregnancy or cases of a lesion which would result in massive necrosis, as in Case I, and that it should be suspected in women with multiple pregnancy, nutritional deficiency and pre-eclampsia. Serial serum uric acid estimations will assist in its early detection. In the cases of Stander and Cadden (1934), of Cullinan (1936) and one of Ober and LeCompte (1955), the blood uric acid level was elevated, but not to levels so high as in our cases.

Reports of acute massive necrosis of the liver with periportal hemorrhage without eclampsia have been made by a number of observers, including King (1933), who

reviewed the cases up to that time, Reis and Bernick (1944) and Eton (1956). Here, also, the clinical picture is that of a sudden illness with nausea, vomiting and pain over the liver, leading to hepatic coma and death. In those cases in which mention is made of the nutritional status, it is poor.

In this group of cases, a more sudden breakdown of liver function, possibly acute enzymatic failure, has been the cause of the acute massive necrosis. It is suggested that the violent vasospasm associated with severe pre-eclampsia causing anoxia of the liver will lead to massive necrosis when the liver is deficient in protective substances, and only to periportal hemorrhage when they are present.

We would postulate that in Case I, an example of "eclampsia without convulsions", we are dealing with the combination of factors depriving the liver of the protective nutritional substances culminating in massive necrosis.

The lesions of fatty infiltration and acute massive necrosis differ histologically; but these differences may be merely because of the speed of onset of the condition, or because of effects on different enzyme systems.

These severe hepatic lesions are accompanied by a progressive rise in serum uric acid levels. While the routine use of this estimation in patients with single pregnancy and pre-eclampsia may not be justified, it would seem that in patients with multiple pregnancy and/or a poor diet, serial estimations should be carried out. The presence of such a condition demands immediate termination of the pregnancy before irreversible changes occur in the liver.

Summary.

Liver failure is an uncommon complication of late pregnancy, usually associated with severe pre-eclampsia and eclampsia, but occasionally appearing as a separate entity. Three cases of liver dysfunction associated with twin pregnancy and pre-eclampsia are described, and evidence is produced to show that nutritional deficiency is an important factor in the aetiology of this condition.

It is suggested that there is a breakdown in enzymatic processes because of the poor nutrition and the extra foetal requirements in the third trimester. When this liver dysfunction is present the anoxia associated with the vasospasm of pre-eclampsia can precipitate acute massive necrosis.

The earliest sign of a derangement of liver metabolism in these cases was an elevated serum uric acid level. When there is a progressive rise in the uric acid level, the possibility of liver dysfunction should be considered before clinical features of liver failure appear.

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TECHNIQUES OF MANIPULATION.¹

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For the first time in many years I am going to read from a prepared script. I apologize for doing so, as the written lecture is rarely as tolerable as the spontaneous discourse; but I believe that this matter of manipulation, along with other related physical medical measures, is highly controversial and unsystematized, and lies in the minds of many in the never-never land between cultism and orthodox practice.

It is interesting to reflect for a moment on this point. The oldest known therapies of mankind are the physical therapies of heat, massage and manipulation. I have little doubt that the first time Adam bumped himself, or tripped and fell in the Garden of Eden—though there may be no record of what he said—he immediately rubbed the sore spot. The spontaneous tendency of all of us to

rub lightly, or firmly, the sites of our injuries, aches and pains is the genesis of massage. The great athletes and sportsmen of the world look towards, and rely heavily upon, the masseur. And yet, in the twentieth century the practice of massage as an orthodox medical measure is still highly controversial and unsystematized. Similar observations and remarks are applicable to the use of heat as a therapeutic measure. Most of us here tonight have undoubtedly on occasion taken solace with the hot-water bottle, the sun, the radiator or other more elaborate sources of heat for our aches and pains; but many of us who have done so would take issue—strong, firm, cynical, etc.—if the discussion tonight devolved around the use of heat as a therapeutic measure.

Our failure to be objective, or even systematic, about the use of these fundamental therapies applies equally to our approach to manipulation—yet another fundamental measure. The relative neglect by orthodox medicine of manipulation has undoubtedly furthered the success and reputation of the bone-setters, the chiropractors and the osteopaths, to whom the desperate, the susceptible and often the medically disillusioned continue to beat a well-worn path.

A brief look into the history of our brother manipulators, and our relationships with them, is both instructive and diverting. Bone-setters have probably been known for ever. The Arabians had a word for it—"algebra"—the reunion of fragments. The bone-setter was usually an untutored man, whose abilities were believed to have been inherited. He frequently possessed a manipulative skill not at the command of the average doctor. His diagnosis of stiff and painful conditions of joints and related tissues was that a bone was out of place. He presumed to be capable of replacing it, but laid no claims to a great and wide knowledge of medical matters outside this sphere.

In the seventeenth century, a surgeon bone-setter and an assistant bone-setter were appointed to St. Bartholomew's Hospital. These appointments were subsequently allowed to remain unfilled—possibly because of certain eighteenth century bone-setters such as Mrs. Mapp, commonly known as "Crazy Sall", and described as an "ignorant, illiberal, drunken, female savage"; she seems to have let down the side.

During the latter part of the nineteenth century, good relations were once more established briefly between the medical profession and the bone-setters, with Sir James Paget pointing out that despite the inadvisability of manipulating a joint when no diagnosis had been made, there were still valuable lessons to be learnt from the bone-setter. Dr. Wharton P. Hodd, a few years later, published articles in the *Lancet* on the lessons he had learnt from the famous bone-setter, Mr. Hutton. In explaining Hutton's methods, Dr. Hodd pointed out that the cases in which manipulations were successful were those in which adhesions had formed in or around a joint, giving rise to pain and limitation of movement. However, Hutton would not accept this theory, and stuck to the traditional one of a bone being out of place.

Shortly after this period of peace and cooperation, John Hilton, of Guy's Hospital, and Hugh Owen Thomas, the orthopaedic surgeon, placed enormous emphasis on the necessity for resting "inflamed" joints, and so the pendulum swung in the other direction. Thomas was the son of a famous bone-setter, who became upset by the damage he saw done when tuberculous joints were manipulated. The final what might be called cooperative relations between the two professions occurred early this century when, after much bitterness, Herbert Barker was "recognized" by the medical profession, and later knighted.

The bone-setters were relative purists—they set definite limits to their claims and techniques. This cannot be said for their fellow manipulators, the osteopaths and chiropractors.

Andrew Still, the man who "thought up" osteopathy, apparently studied medicine for a short time at Kansas City School of Physicians and Surgeons, went to the Civil War, studied bones from Indian graves, then sat and thought until 1874, when, as he says, he was "Shot—not

¹ Read at a meeting of the Victorian Branch of the British Medical Association on February 18, 1959.

in the heart, but in the Dome of Reason". He was inspired, saw visions, and wrote: "God is the Father of Osteopathy, and I am not ashamed of the Child of His Mind."

Osteopathy, according to Still, was not limited to disorders of bones and joints—it embraced all aspects of medicine, and was opposed in theory and practice to medical science. Still maintained that all diseases were caused by pressure of displaced bones or contracted muscles upon nerves, arteries and veins. He stated:

When veins cannot carry off drainage we have fermentation, sore tonsils, congestion of the cervical glands generally, with a face puffed up by stagnation due to stoppage of the return fluids.

He stated that such was the cause of tonsillitis, measles, goitre, tumours of all types, and anything else including mental illness. The cure was manipulation to remove the obstruction.

Still had other curious beliefs. He has written:

I am sure that the artery takes blood from the heart for the purpose of depositing it into the womb-like cells of the nervous system, in which atoms of living flesh are formed by nerve processes that act to give life, motion and form to organs, muscles, and all parts of the body. Surely a species of conception takes place as the arteriole connects with a nerve cell which proceeds to form living atoms of flesh.

Andrew Still composed a creed, consisting of nine articles of faith, which commenced:

1. We believe in sanitation and hygiene

Articles 8 and 9 are of interest:

8. Osteopathy is an independent system and can be applied to all conditions of disease, including surgical cases, and in these cases surgery is but a branch of Osteopathy.

9. We believe that our therapeutic house is just large enough for Osteopathy, and that when other measures are brought in, just that much of Osteopathy must move out.

Still has been described as a "Stroker, Bone-Setter, and Christian Scientist rolled into one", but manipulation was a basic premise of his creed.

Time moved on, and so did the osteopaths, until they began to neglect to some extent the teachings of Still, and became aware that by manipulation alone a lot of diseases could not be cured. They moved away from their close relation to homeopathy, but stuck to the basic "osteopathic lesion", which has never been defined even during the hearings of the Select Committee of the House of Lords on the "Registration and Regulation of Osteopaths" Bill. Originally, this osteopathic lesion was the same as the bone-setter's lesion—that is, a dislocation; it could be in the spine or anywhere, the hip joint at one time being a great favourite. Then it became a minor subluxation, the hip having been given up at this stage. As far as can be gathered, the subluxation gave place to the sprain or strain—a lesser entity, but still fraught with grave consequences just lacking the drama of the dislocation.

In spite of the progress of osteopathy and the concessions made to modern medical knowledge, the dislocations, subluxations, etc. of the spine are still the *sine qua non* of most illness in the world of the osteopath, and manipulation is the therapy elect.

The first chiropractor was J. B. Palmer, and he first saw the light in Iowa in 1894. His father had caught a glimmer of the light a little earlier, but was rather quieter about it all, and was diverted to become a magnetic healer. Young Palmer studied with old Doctor Still for a while, but then defected, and went on his own sweet way, which may explain this definition of chiropractic: "Chiropractic is the first three weeks of osteopathy."

In his study with the osteopaths, Palmer only got as far as the rule of the nerve, and then he altered that. He focused his entire attention on dislocations, subluxations and sprains, and offered the following as an explanation of disease and pain.

The brake pressing on the nerve as it emerges from the spinal column keeps the nerve from transmitting the energy that makes the wheels of the body go round properly.

Originally, in the world of chiropractic, everything was cured by manipulation. The chief manipulation was known as the chiropractor's thrust. The patient was laid prone, the manipulator's hands were placed over the spine at the level of the assumed lesion, the manipulator jumped forward suddenly with all his weight going onto his hands. This can make quite a startling and resounding "bang!" when done with skill, and is really most impressive. It also undoubtedly relieves certain types of pain.

The chiropractors tended to drift further and further from scientific theory, while the osteopaths endeavoured to embrace this and bring it within, to them, their well-reasoned theory of the basic cause of disease. The chiropractors have coopted various interesting machines, such as the Abrams box and J. B. Palmer's own invention, the neurocalometer—a wonderful little gadget that can be applied to various parts of the spine; when you get to the site of the lesion, it vibrates wildly—you then know where to apply the thrust. Those of us using manipulative techniques within the framework of orthodox medicine must stand up for the counting, viewed and not infrequently measured against the foregoing background.

If a census was taken of the number of doctors regularly using manipulative techniques, I believe the tally would be small. If among this number an effort was made to establish criteria for manipulation, standard techniques of manipulation and assessment of results of manipulation, I doubt if the answer would be significant.

Review of the medical literature in this field demonstrates that frequently the orthodox doctor, although less colourful in his claim, is often little more scientific than his manipulative brethren mentioned previously. For example, there is one school of thought, numbering many excellent doctors, that strongly supports manipulations under general anaesthesia; while there is a contra school, of equally eminent practitioners, which abhors the practice. Watson-Jones, an adherent to the latter school, writes:

Massage and movements, commonly prescribed as a treatment for stiff joints, is, in fact, one of the commonest causes of stiff joints. When the adhesions already formed around a joint are violently stretched or torn, there is a reactionary exudation which produces fresh adhesions.

I have met a number of doctors who have worked under Watson-Jones, who respect him highly, and yet routinely do quite violent manipulations under general anaesthesia—manipulations of backs, necks, shoulders, etc. I have even heard it stated that it is justified to manipulate under anaesthesia a patient suffering from low-back pain with sciatica, for diagnostic reasons; if he fails to respond to the manipulation, or gets worse, the diagnosis of prolapsed disc is established and operation is indicated. Even if the most tolerant attitude is assumed, it is difficult to reconcile these widely divergent opinions and practices. The fact is that almost everything in this area of medicine is based on personal opinion and empiricism, and coloured not infrequently by the dramatic responses often obtained by simple, infrequently used manipulative procedures.

Before proceeding to give an account of my own views and techniques on this subject, which must regrettably be qualified for the most part by what I have just said, I will take a few minutes to review some of the more common manipulative techniques as used by some of the better known exponents of the art.

It is impossible in the time available to cover more than a few techniques, and it is probably better that we concentrate on manipulations of the cervical, dorsal and lumbar spine, and then consider principles in relation to other joints. The cervical spine is, beyond doubt, the origin of a great deal of pain. This pain has a wide distribution. It may take the form of local pain, torticollis, stiff or wry neck; it may radiate into the shoulders, down the arms to the hands and fingers; it may radiate upwards and produce acute or chronic occipital headache; it may even present as frontal headache. The cervical

spine is perhaps the most common cause of headache. The differential diagnosis of head, shoulder, arm and hand pain is a major challenge. If the neck is not a primary cause of pain, it may well be a secondary one, and if it is neglected therapeutically, the secondary cause may replace the primary, and an eminently curable condition is left uncured. We cannot go into these aspects of the problem; but it should be said that these far supersede the relatively simple techniques of manipulation. Accept the fact, therefore, that a neck must be manipulated. How do we proceed?

Edward B. Ewer (1953) proceeds in the following manner. He sits his patient in a chair, applies a head traction apparatus and gives a traction of 30 to 40 lb. for a few minutes. This is followed by massage, then passive rotation movements of the neck. For acute conditions, this is carried out three to five times per week. For chronic conditions the same routine is followed, but exercises in postural correction are prescribed. He believes that manipulations should never be done under anaesthesia, and that if one procedure brings relief, no more manipulations are needed.

William Bierman (1947) uses an entirely different technique. He first applies heat and massage to the muscles of the neck to relieve spasm and to obtain relaxation. He then stands the patient with legs apart, knees slightly bent, spine slightly flexed and arms hanging loose. He takes the patient's chin in one hand, placing his other hand on the patient's shoulder, and gently rotates the head from side to side until the patient is relaxed, then makes quick forceful rotation movements. He never manipulates under general anaesthesia.

James Cyriax (1953, 1956) one of the most controversial but best established figures in this field, approaches the problem in yet a different manner. He once made the statement: "If something is out of place, put it back again." It is difficult to disagree with this, and it is axiomatic in our approach to these problems. Cyriax attacks the problem of cervical manipulation in the following manner (all manoeuvres are carried out with a helper holding the patient's shoulders): (i) Straight pull into extension, then hold; he sometimes adds slight rotatory movements at the end of the pull. (ii) Pull into extension, then rotate, first to the painless side. (iii) Pull into extension, then side flexion—away from the painful side. (iv) Pull into extension, then gliding movement—side to side, then front to back. If after three sessions there is no improvement, no further manipulative treatment is given; the patient is then given bed rest with prolonged traction.

Others use traction with the patient on an inclined plane, or lying horizontally in bed, using weights and pulleys. There are innumerable variations on this theme, and it is impossible to deal with these in this paper; but I will attempt to summarize when I offer my own views and techniques.

The cervical spine is a relatively flexible entity, lending itself readily to manipulation. The dorsal spine, particularly the upper part, is a different kettle of fish. It is again interesting to speculate on the diagnostic problems to which the dorsal spine can give origin. Nerve-root interference at various levels can simulate most intra-thoracic disease and much intraabdominal disease. I often wonder how many gall-bladders have been removed because of nerve-root interference at the ninth dorsal level, and how many patients with ruptured or leaking gastric ulcers or attacks of acute pancreatitis have had "spontaneous remissions" when "something" has occurred at the tenth to eleventh dorsal level. Let us not mention renal colic and pelvic problems. Is it any wonder that our chiropractic and osteopathic colleagues grow confused? However, our purpose is to discuss techniques rather than when they should be applied, so let us assume that a dorsal spine must be manipulated. How do we proceed?

Cyriax lays his patient in the prone position, and has one operator pulling on the arms and another on the feet. He stands with his hand over the area of the spine to be manipulated. The pressure can be central or over the

transverse process. One hand is placed on top of the other to give firmer pressure. He stands with his feet well away from the patient, leaning forward, and then jumps to a vertical position, bringing his entire weight down through the line of his arms. This is, in fact, the chiropractic thrust. He then performs the following movements of rotation, which are better demonstrated than described; however, description must suffice: (i) lying on side, arms and legs held to give traction, hand on scapula and pelvis—rotate with push; (ii) lying prone—pelvis sideways, traction as before—pull the pelvis back and push shoulder forwards; (iii) supine—flex hip and knee of painful side, take across body and push.

Edward B. Ewer has an entirely different approach. He stands behind his patient with his arms hooked under the patient's arms and hands clasped in front of the patient's chest. The patient exhales and relaxes, while the doctor lifts and pulls back, simultaneously compressing the rib cage. This is done two or three times, with a change each time in the level of the arms. To get at the upper three or four thoracic vertebrae, Ewer stands behind his patient, who in turn has his hands clasped behind his own neck. The doctor hooks his arms under the patient's arms, and also places his hands behind the patient's neck. The patient leans back and relaxes—the doctor lifts, forces the patient's neck forward, and simultaneously rotates it gently. This apparently complicated procedure is in fact quite simple.

There are also infinite variations on this theme, which in present circumstances are impossible to assess.

Low or lumbar back pain is the manipulators' delight. This structure is a firm and apparently stable piece of human architecture productive of more aches and pains than could be expected. It is responsible for fortunes for the manufacturers of backache and kidney pills, good incomes for the manipulators, headaches for employers and insurers, lost millions in productivity, and perhaps nearly as much absenteeism as the common cold. In summary, low-back pain is the dilemma of modern industrial society.

In Ontario, Canada, where workers' compensation legislation and injured workers' medical care are under excellent control, the "bad back" is responsible for in excess of 16% of all claims and expenditure. Here in Victoria, the "bad back", as represented by the classification of injuries resulting from lifting alone, or from lifting without the assistance of mechanical aids, is of the same proportion.

As we descend the human spine, we approach ever more controversial territory from a diagnostic, therapeutic, economic, social and legal point of view.

Techniques for manipulating the lumbar spine are so numerous that it is difficult to know where to begin. One of the most commonly used measures I have seen is for the manipulator to stand back-to-back with the patient, and hook arms. The manipulator then suddenly flexes his spine, lifting the patient's feet from the ground and simultaneously and vigorously hyperextending the patient's spine. I have seen a few doctors sustain quite a good back injury in this manner. I know nothing of the results so far as the patient is concerned.

Ewer never manipulates the lumbar spine if there is associated sciatica. If there is low-back pain but no sciatica, he lays the patient supine and pulls vigorously on the legs; this is followed by forcefully flexing the hips and then by a series of rotation movements. He also believes that attention must be paid to posture, and that the use of a brace or support of some kind is a good idea.

I knew an excellent orthopaedic surgeon in Canada who had practically given up operating for low-back pain with associated sciatica in favour of a very simple manipulation of his own devising. He had the patient lie supine on a couch and make pedalling movements as though riding a bicycle. He would then talk the patient into a state of relaxation, and when the patient least suspected it, he would move quickly into X position and vigorously wrench

the affected leg in a horizontal direction. He was an extremely strong man, but as far as I know never dislocated a patient's hip. He claimed excellent results—superior to his operative results; I had no means of assessing these.

N. B. Eastwood of Suffolk, claims to have dealt with 300 cases of backache or pains allied to backache over a period of three years. He states that he has manipulated the spine in 85% with good results in the majority. With the failures, he holds that attention to general health, followed by further manipulations, usually brings a good result. He manipulates in the following manner. The patient lies supine, and flexes and abducts his thigh. The doctor places his toe in the vicinity of the patient's posterior superior iliac spine and pulls firmly on the flexed, abducted thigh. Eastwood uses this manoeuvre for all types of backache, including menorrhagia with backache in some cases, and for pain in the iliac fossae in certain cases. There would seem to be no way of objectively assessing his results.

Cyriax has done a great deal of observation on and thinking about problems associated with the lumbar spine. He has attempted to systematize his observations and similarly his therapeutic measures. Whatever we may think about his claims, we must acknowledge his excellent effort in this regard. In fairness, his therapeutic measures should be considered in association with his not always orthodox diagnostic procedures and classifications. However, time does not permit me to discuss this, and at the risk of being unfair, I will briefly consider his manipulative technique.

For most lumbar backache, Cyriax considers manipulation as the treatment of choice. He never manipulates under general anaesthesia, and follows out the following four routines in strict order, ceasing at the point where relief is attained.

1. In essence, the chiropractor's thrust, which has been described previously.

2. Rotation. The patient lies supine, and flexes the hip and knee on the painful side. The flexed lower limb is then forced medially. (If you are prepared to have this manoeuvre tested on yourself, you will probably feel movement in the lower thoracic spine with "snaps" at that level. The lumbar spine has no ability to rotate.)

3. Sustained rotation. As above, but pressure is sustained.

4. The patient lying on the side, with the painful side uppermost, the upper knee flexed, the upper arm placed behind the back; the pelvis is pushed forward and the shoulder back.

It seems to me to be equally impossible to assess Cyriax's results. Apart from these manual manipulations, Cyriax and many others apply various forms of mechanical traction for lumbar back pain. Now there are probably as many forms of traction apparatus as there are techniques of manipulation. Some advocate that traction should be given with the patient lying prone, others with the patient lying supine; some prefer an inclined plane, others a horizontal bed; there are advocates of the divided bed, which makes it possible to hyperextend the spine simultaneously. Some believe that traction should be given for half an hour and more, others that it should be applied continuously for several days. Some advocate 100 to 200 lb. of pressure, others 40 to 50 lb. We could spend hours in this realm of opinion, generating controversy, but getting nowhere fast.

Like Cyriax and many others, I hold strong and definite views on the indications for and techniques of manipulation. I am fully aware that many of these are as difficult to defend as the issues raised already—they are the results of experience and, I believe, reasoned opinion, which I hope in due course will be substantiated by objective results properly assessed. As and when these views and opinions are not substantiated, I trust I will be flexible enough to alter them accordingly. It now remains for me to take the plunge, set down these opinions and techniques, and throw myself on your mercy.

I must point out that, when I speak of manipulation, I refer to all forms of traction and passive posturing, not

merely to the forceful and sudden efforts to "replace something out of place". In my approach to all manipulations, I am guided by certain principles, which can be set down as follows:

1. Avoid all possible trauma. I agree largely with Watson-Jones that forceful, sudden manipulations must aggravate a traumatized or degenerated joint, producing exudations and possibly forming adhesions. Traumatic arthritis is a recognized entity. Exudate and round-cell infiltration cause pain, immobility, reflex spasm of soft tissues and wasting from consequent disuse. These are the issues we are frequently trying to overcome—why set about creating them with additional trauma?

2. For these reasons, I am opposed to any manipulations under anaesthesia. My views on this point are reinforced because I so frequently have to care for patients whose condition has failed to respond to, or been made worse by, manipulation under anaesthesia. Naturally, I do not see the successes of those who use this technique, and am therefore prepared to admit to a certain degree of bias on this point.

3. All manipulative technique should be preceded by measures directed towards obtaining maximum muscle and soft-tissue relaxation. These measures are principally the application of heat and massage.

4. The one-shot, dramatic-relief manipulation is in my experience a rarity, and for reasons stated above, should not usually be aimed at. The aim of manipulation should be to restore mobility, and even when pain is dramatically relieved by manipulation, full mobility is seldom gained. Acute cervical pain, and in some acute back pain associated with it after the time of onset, may respond completely.

5. The majority of conditions requiring manipulation are of long standing, with considerable loss of mobility. Repeated, gentle but firm manipulation with associated planned exercises, etc., will often restore a considerable amount of mobility. Pain usually subsides with increasing mobilization.

6. Frequency and persistence of treatment are a *sine qua non* of success in these cases. In the beginning one gains ground very slowly, and in a day away from treatment any gain made can be lost. If the patient can tolerate it, treatment two or three times a day is in order. Treatment two or three times per week can go on interminably, to the utter frustration of both patient and therapist, and to the loss of reputation of the latter.

7. Local anaesthesia can be useful if used with caution—for example, to cut out reflex pain from various "trigger points", and so permit a better range of manipulation. It should never be used for over-all suppression of pain—if so, we may as well use general anaesthesia.

I will elaborate on some of these points as I discuss particular techniques in more detail. Now, as I have done in the rest of this paper, I will concentrate on spinal manipulations.

The Cervical Spine.

As I said previously, the cervical spine is the source of a great deal of pain—head, neck, shoulder, arm and hand. It is, in my view, perhaps the most frequent single cause of headache. These conditions, when due to abnormality in the cervical spine, respond well in the majority of cases to adequate physical treatment. The emphasis is on adequate.

Once a diagnosis has been established, my routine is as follows: (i) Short-wave diathermy is applied for 20 minutes. (ii) Massage is carried out for 15 to 30 minutes. (iii) The patient is then laid supine, and prolonged horizontal manual traction is applied to the head, preferably with a second operator holding the shoulders. (iv) Full range (within the limit of the patient's tolerance), firm but gentle manual manipulation is carried out—lateral flexion, forward flexion, extension and rotation. This manipulative routine is repeated several times. (v) In certain cases—notably those of very long standing, in which loss of mobility is marked—mechanical traction is also given. This is done in one or two ways: (a) A head brace is fitted with the patient standing on the ground.

A rope from the brace is passed over a bar directly above the patient's head. The patient is asked to stand on his toes, and the brace is pulled up until reasonable pressure is exerted. The patient then lowers his heels and regulates the limit of neck traction he can tolerate under self-controlled application of his own body weight. No attempt is made to measure the force applied. (b) Alternatively, the brace is fixed as described above, but the patient stands on a hydraulic platform, which is under very fine control. The therapist is in charge of its control, and the patient is instructed how to signal when his limits of tolerance are reached. By using the platform, it is possible to give rotatory manipulations while the patient is in traction. It is interesting to note the frequently greatly increased range of pain-free rotation while the cervical spine is in traction. This treatment is carried out every day—seven days a week. Sometimes treatment is given twice a day (principally for country patients). The patient is also instructed in neck exercises, which are similarly full-range within the limits of tolerance, and asked to do these several times a day.

The range of time for treatment is roughly 7 to 21 days, according to the duration of symptoms and the degree of loss of mobility. This would seem to be a more accurate index of duration of treatment than severity of symptoms. The rate of symptomatic cure is very high.

I regret that I cannot be more specific than this, but a series is in progress at the moment, and carefully designed control experiments are planned for the future.

Patients, more particularly elderly patients with degenerative disease of the spine, are asked to report back when they notice further loss of mobility (their range before and after treatment is demonstrated to them in a mirror) or early return of symptoms. A short course of treatment (4 or 5 days) usually corrects their early recurrent problem.

In the course of history-taking careful attention is paid to sleeping habits, occupation, motor-car driving, television watching, etc., and instructions are given to avoid long periods with the neck in flexion.

Some persons are seen who have a good—or full—range of neck movement and yet have intractable attacks of occipital pain. I have yet to see any of these respond to physical measures, and in my view, division of the occipital nerve is well justified. Similarly, there are some who have severe head pain and simultaneously shoulder and arm pain (usually in the older age-group with degenerative disease). Severity of pain may make this form of treatment impossible. Division of the occipital nerve will sometimes make these other measures practicable and be followed by relief of shoulder and arm pain.

Time does not permit me to give more details with regard to handling the cervical part of the spine, but I wish to make certain points, however briefly.

1. Within reason (when there is no contraindication such as ununited fractures of vertebrae), traumatic and degenerative disorders can be handled on the same basis.

2. I am opposed to the use of the Zimmer collar in all but exceptional circumstances.

3. The clinical findings are more important in planning therapy than are the radiological findings. Some of the most deplorable-looking cervical spines (radiologically) respond dramatically to treatment.

4. Never neglect the cervical spine in cases of migraine, in so-called neurotic women and in shoulder injuries. The neck can, in all these, and in other allied cases, become a secondary cause of pain, frequently outweighing the primary cause.

The Thoracic Spine.

The thoracic spine seems to give rise to far less trouble than either the cervical or lumbar spine, but when trouble does occur, the same therapeutic principles as mentioned above are applicable.

It is possible to apply considerable manipulation to the thoracic spine with the patient standing and relaxed.

For the middle and lower thoracic spine, the manipulation I most commonly use is rotation with simultaneous lateral flexion directed away from the side of the pain. Incidentally, this is a good diagnostic test for referred intercostal nerve pain which may be simulating intrathoracic disease, there being no history of back pain. In this instance, the manoeuvre is made in the direction of the side of the pain, and if necessary, sustained for some moments.

The high dorsal spine is more difficult to "get at" from the manipulator's point of view. In fact, in my view, traction is perhaps the only reasonable manipulative technique in this instance. Neck traction as previously described undoubtedly also stretches the upper dorsal spine to some extent. The same traction apparatus is also used with the body weight being taken from the axillae. In the great majority of cases, full body weight, irrespective of the patient's obesity, build or age, can be taken for from 2 to 5 minutes when the point of suspension is the axillae. I have never seen this cause brachial plexus neuritis.

Some of the manipulative routines just mentioned can be executed with the patient in traction. To save repetition, I will deal in more detail with these matters when discussing the lumbar spine.

The Lumbar Spine.

Earlier, I gave my opinion that "the bad back", by which I mean the lumbar spine, is the dilemma of modern industrial society. The "bad back" is costing us millions a year, and presents one of the most worthy research challenges possible. In these circumstances, and with so little time at my disposal, I hesitate to launch into the subject; but having set the pattern for this talk, I am obliged to do so. I would suggest that a meeting similar to this should be devoted to just this subject. The best I can do in the circumstances is to summarize my own therapeutic approach and experience, and hope for the best.

The vertebral column is a magnificent piece of architecture and engineering, but slight "derangements" can cause infinite trouble. The majority of low-back pain I regard as "non-specific"—a symptom complex involving joints, ligaments, muscles, nerves and fascia. Specific nerve-root interference with referred pain, from a therapeutic angle, in the first instance, can be considered with the non-specific group.

The therapeutic routine I follow is as follows. (i) Short-wave diathermy is given for 20 minutes. (ii) Massage is given for 15 minutes. (iii) Axillary traction is carried out as described previously. (iv) Exercises away from the side of the pain are performed. These are mainly rotation, lateral flexion and extension. (v) Manipulations are carried out, also away from the side of the pain and involving the same movements as for exercises. These are used relatively infrequently, and then as a steady, sustained manoeuvre. This is a daily routine—more frequent if possible. Manipulations can also be given while the patient is in traction.

Traction may involve taking the whole of the body weight from the axillae, or the hydraulic platform may be used. In this instance, the patient can be so postured that traction can be given while his spine is in various degrees of extension. It is interesting to note that a few seconds of this type of traction will sometimes relieve the most acute sciatic pain. An upthrust of a few pounds will reproduce the pain.

In the course of treatment, quite specific sensory change can sometimes be elicited. Progress to a lost reflex and the steady and sometimes dramatic regaining of this have been noted. Motor involvement with paresis of the dorsiflexors, etc., can be observed to come and go. It is just not possible to discuss these matters this evening, but they have quite a specific relation to lumbar spinal injuries and their treatment.

A changing pattern of pain, sensory disturbance, etc., in the course of treatment appears to correlate with a

good prognosis. No patient, except one whose pain is so severe as to make transportation or treatment utterly impossible, is given bed rest. The sooner treatment is commenced, the better. I have never prescribed a spinal brace, and always aim to dispense with these braces as quickly as the patient who comes to me wearing one can be weaned from it. As for cervical problems, full attention is paid to sleeping habits, working activities, posture, motor-car driving, etc. Other important points to observe are associated scoliosis, which frequently requires building up of a shoe, quadriceps wastage resulting from "favouring" a painful leg, etc.

When trouble occurs at one level of the spine and persists for any length of time, there is nearly always secondary trouble at another level. This must not be neglected, and it is frequently necessary to treat a cervical lesion along with a lumbar lesion.

Conclusion.

I realize that in these last few minutes I have made numerous dogmatic statements, unsubstantiated by other than my own opinions and experience. I have undoubtedly added fuel to an already glowing fire of controversy; but if I have stimulated objective thought and not merely antagonism, this is to the good. A series of case histories of backs handled along the lines described is presently being analysed, and further properly planned and controlled experiments are contemplated.

I would like to take this opportunity to emphasize the fact that there are emotional and social factors associated with back troubles that frequently outweigh the physical problem, and that these should be our major concern along with the physical treatment.

Time does not permit even a mention of problems in relation to other joints; but, as I see it, the principles I have discussed apply across the board.

In conclusion, I would like to stress that I believe great therapeutic benefits can be obtained from the intelligent and proper use of manipulative techniques, but that much more work needs to be done before these become universally applicable. Finally, I would echo the words of Sir Robert Jones: "It is sufficient to say that we should mend our ways rather than abuse the unqualified."

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MANIPULATIVE TECHNIQUE.

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SINCE the title of this paper is manipulative technique, I feel that I should say a few words about this aspect; but I should like to discuss mainly the principles underlying manipulative treatment.

I do not think that manipulative technique should offer any great problems, provided the aim of the manipulation is kept in mind. First, it is possible to restore to a joint only movement which has been restricted by some particular condition. It is important, then, to realize that manipulation should not attempt to produce movement of which a joint was never capable. Hence an adequate knowledge of the function and anatomy of the part to be manipulated is absolutely essential. Secondly, it is important that the manipulation should not be too vigorous, so that it breaks down the normal structures of the joint. Thirdly, if a part is resistant to manipulation, it may well be that repeated gentle manipulations will achieve a better result than one vigorous stretch, which stirs up a large inflammatory reaction and abnegates the final result.

It is my intention to confine my talk to the discussion of manipulation in regard to conditions of the lumbar region.

In view of the fact that many conditions which produce pain in this area are found to be without an obvious pathological basis at operation or even at autopsy, then an explanation of the cause is pure conjecture. However, in the light of principles which apply in other parts, it is reasonable to try to explain the actual pathological basis, and find some principles on which to base manipulative treatment and assess what may be obtained from manipulation.

Breaking Down of Adhesions.

A reasonable example is in the chronic low-back strain of the postural type. This occurs frequently in women aged between 30 and 40 years who have recently had several children. These patients usually exhibit lordosis and restriction of movements in rotation and hyper-extension. The sites of tenderness are in the loins, about the attachments of quadratus lumborum to the transverse processes of the lumbar vertebrae, and along the iliac crests. It is not easy to offer an explanation of the exact pathology, but it is reasonable to assume that the poor posture, plus the extra burdens of pregnancy and the softening of the fibrous and ligamentous structures in the back during pregnancy, may give rise to a low-grade inflammatory condition at the muscle attachments. As a result of this, adhesions form. Manipulation often produces dramatic relief, and it is reasonable to assume that it is the breaking down of these adhesions which gives the result.

Patients who have had a moderate or severe back strain frequently exhibit symptoms of pain on certain movements, which persist for months. The healing of torn muscle or fibrous tissue in the back is by scar, which remains painful to stretching for a long period. This group, I believe, should include avulsion of the lumbar transverse processes, which should be regarded mainly as a soft tissue injury; the avulsion indicating only the degree of muscle damage. Manipulation appears to be beneficial to these patients only after the scarring or adhesions have become consolidated and relatively avascular. Early manipulation will only lead to further inflammation and scar formation.

Reduction of an Intraarticular Displacement.

In the back, this applies only to the intervertebral disk. It is now well recognized that, as the result of

¹Read at a meeting of the Victorian Branch of the British Medical Association on February 18, 1959.

degeneration of a disk, part or whole of the nucleus separates from the surrounding annulus and vertebra and becomes virtually a loose body enclosed in the disk space. With a particular movement, it is possible for the loose body to become impacted in a corner of the space, just as a loose body becomes impacted in a knee joint. When this occurs, a sudden, severe protective muscle spasm follows. This is designed to prevent movement at the affected disk, and further damage. The result is a sudden paralysing muscle cramp. Surely this is the condition which has previously gone by the name of fibrositis or lumbago. If the impaction of the nucleus can be relieved, the painful muscle spasm will subside. Conversely, if the muscle spasm can be relieved, the impaction will frequently dislodge itself. It is not advocated that manipulation is the treatment of choice for this condition in the early stages; but should it persist for several weeks, manipulation may then be very rewarding.

I do not believe this to be the only cause of lumbago; but I think the abnormality lies in the disk rather than in the muscle in this condition, since one often sees a march of symptoms over months or years—lumbago, back pain and finally sciatica.

It is essential to reflect on the innervation of the disk in order to get an idea of the mechanism of the symptoms. Von Luschka in 1858, and Roope in 1940, have drawn attention to a nerve which arises from a segmental nerve as it passes out of the intervertebral foramen. This fine branch reenters the spinal canal and passes down two or three segments, where it then supplies the disk.

In the early stages of disk degeneration in the lumbar spine, it is common to find referred pain in the lower part of the abdomen. This must come from the nerve endings in the disk itself, and the pain is referred to an area two or three segments above. It is possible that muscle spasm in this region can be produced by the same mechanism. It is only when the disk ruptures that radiating pain, as distinct from referred pain, is produced over the corresponding segment. This is due to direct pressure on the adjacent nerve root at the same level as the disk.

Reduction of Subluxations or Dislocations.

Subluxation and dislocation are not met with except in hospitals dealing with severe trauma. A great deal of force is necessary to produce either condition, and I believe this is never a cause of the sudden low-back pain from minor industrial strains. It is unfortunately the line on which osteopaths and chiropractors trade, and I believe that they should be strongly condemned for deliberately misleading the public in this belief.

Clarification of a Clinical Picture.

In a case of persistent low-back pain and sciatica which has not responded to simple measures, a manipulation will often resolve the difficulty of both a diagnosis and the future course of treatment. After such a manipulation, signs frequently appear which localize a disk prolapse to a particular nerve root.

Undoubtedly operation may become necessary, but on the other hand, a prolapsed disk may absorb with conservative measures, whereas without frank prolapse it may grumble on for years. A possible reason for this is that the blood supply within the disk is very poor. Healing or absorption of a sequestered part of the nucleus is, therefore, slow and incomplete. If the disk ruptures, the profuse blood supply within the spinal canal can either absorb or cause scarring of the protruded portion. While the annulus bulges and does not rupture, this cannot occur.

What Cannot be Obtained by Manipulation.

Permanent Replacement of a Prolapsed Nucleus Pulposus.

It is quite obvious that a disk must first undergo degeneration before any prolapse may occur. After

degeneration, the sequestered part of the nucleus may cause the annulus to bulge, and this bulge may be sufficiently large to produce pressure neuritis of the adjacent nerve root. The final stage comes when the annulus bursts and the nucleus prolapses, compressing the nerve root as it passes to the intervertebral foramen. It is apparent, then, that since the disk is part of the weight-bearing mechanism, replacement of the prolapsed nucleus is impossible—as impossible as getting toothpaste back into a tube which is constantly being squeezed.

It is conceivable that a large dry sequestrum of nucleus which is causing the annulus to bulge may be moved to a less vulnerable part of the disk cavity by manipulation, and in consequence the sciatic symptoms may be temporarily relieved; but it is surely only a matter of time before the sequestrum seeks out the weakened part of the annulus and so produces a recurrence of symptoms. The other possibility is that manipulation may break down adhesions between a bulging disk and the adjacent nerve root and relieve symptoms in that manner. However, I consider that I could count on the fingers of one hand the patients whom I have relieved by manipulation, when a complete clinical picture of a disk prolapse is present.

Relief of Muscle Spasm.

Muscle spasm, except in primary inflammatory conditions due to direct trauma or local infection, is always a protective mechanism, designed to immobilize a part. Thus direct attempts to relieve muscle spasm defeat the purpose. The treatment must be directed to the cause of the spasm.

Conclusion.

In conclusion, I should like to discuss manipulation and anaesthesia. I do not believe that I can obtain, by manipulation without anaesthesia, anything that a properly conducted course of physiotherapy cannot obtain. But should the physiotherapy fail, then I believe a manipulation under anaesthesia, with the absence of muscle antagonism and spasm, may produce results.

Reports of Cases.

DISSEMINATED ABDOMINAL MELANOMA TREATED BY MASSIVE DOSAGE OF NITROGEN MUSTARD AND AUTOGENOUS BONE-MARROW REPLACEMENT.

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DISSEMINATED MALIGNANT DISEASE in the past has been considered an invariably fatal condition, in which no therapy was of any avail except in the production of symptomatic relief. The introduction of autogenous marrow infusion by Kurneck et alii (1958) was a major advance in the treatment of these patients, enabling previously lethal doses of irradiation or of cytotoxic drugs to be given with survival. This case report concerns the use of a massive dose of a cytotoxic drug followed by autogenous marrow replacement in the treatment of widespread intraabdominal melanomatous metastases.

Clinical Record.

Mrs. B., aged 29 years, had a malignant melanoma excised from the right scapular region in July, 1954. Two years later, she developed enlarged lymph nodes in the left axilla, and axillary dissection was performed at the Manchester Royal Infirmary. She remained in good health, but a routine chest X-ray examination in December, 1957, revealed an opaque area in the lower lobe of the left lung. After investigation, a left lower lobectomy was performed by Mr. Ian Monk. This lobe contained two deposits of melanoma; but no abnormality was found in the remainder of the lung or the pleural cavity. Subsequently, the patient

being 5.3 grammes per 100 ml. Her leucocyte count was within normal limits, and sternal marrow biopsy showed no malignant cells. Transfusions were given, and before operation the haematological findings were as follows: haemoglobin value, 12.2 grammes per 100 ml.; leucocytes, 11,000 per cubic millimetre (76% neutrophils, 2% eosinophils, 7% lymphocytes, 13% monocytes and 2% band forms); platelets were plentiful. The prothrombin index was 99% of normal, and the serum uric acid content was 3.4 mg. per 100 ml.

Under general anaesthesia on August 7, the abdomen was opened. The findings included massive involvement of the

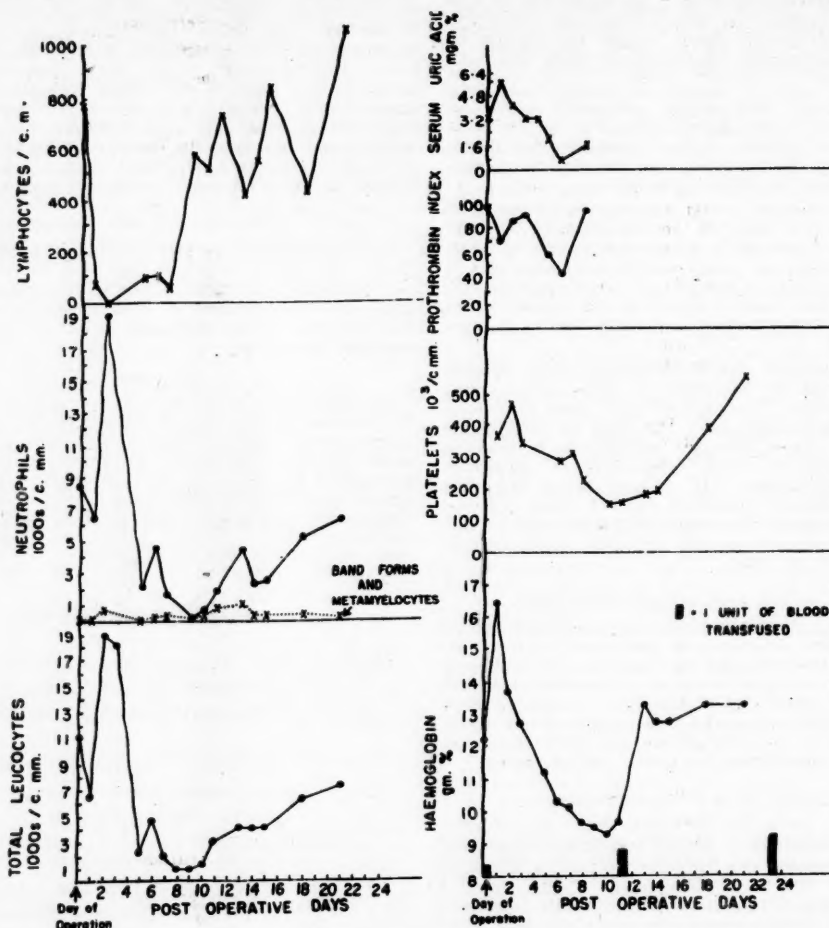


FIGURE 1.

resumed her normal activities, including playing tennis. In May, 1959, she complained of progressive lassitude, weakness and loss of weight, and at the same time noticed an abdominal swelling, which was painful, and which rapidly increased in size during the following weeks.

When she was examined by us on July 14, 1959, she was very pale and obviously ill. There was a multilobular tumour within the abdominal cavity, which appeared to lie in the mesentery of the small bowel. The tumour measured 10 cm. at its greatest diameter. The spleen was enlarged to 6 cm. below the costal margin. There was no clinical or radiological evidence of metastases outside the abdominal cavity. Haematological examination showed microcytic hypochromic anaemia, her haemoglobin value

proximal two feet of the jejunum and its mesentery, small pigmented plaques on the serosa of the bowel and peritoneum, nodules in the retroperitoneal tissues, and a large deposit in the upper pole of the spleen. The affected jejunum and its mesentery, with a large nodule from the left paracolic gutter, were resected, end-to-end anastomosis between the fourth part of the duodenum and the jejunum was performed and the abdomen was closed.

Sixty-five millilitres of marrow were then aspirated from the sternum and iliac crests, and stored in siliconed tubes containing a total of 5000 units of heparin at 4° C. Twenty milligrammes of nitrogen mustard were given at intervals of 15 minutes to a total dosage of 60 mg., equivalent to 1.5 mg. per kilogram of the patient's body weight, as

advised by Westbury (personal communication). Six hours after the last injection of nitrogen mustard, the stored marrow, previously warmed at 37° C., was reinfused intravenously over a period of two hours. No symptoms or signs suggesting embolic phenomena occurred.

The patient's initial convalescence was uneventful, and normal alimentary function was resumed on the fourth post-operative day. She was given a total of 20 ml. of gamma globulin, and 10 mg. of vitamin K were given intramuscularly each day. Strict barrier nursing was employed; but antibiotics were not used until the tenth day after operation when, during the period of maximal leucopenia, she had a slight fever. Twenty-three days after operation, she suddenly developed a tense, tender, retroperitoneal swelling, and the same day haematemesis and melæna occurred, requiring blood transfusion. No evidence of a coagulation defect was found, and the platelet count was normal. The alimentary bleeding ceased after three days and the abdominal swelling gradually became smaller. She was discharged from hospital ten days after this episode. She is now symptom-free and has gained 2 kg. in weight, and her blood picture is within normal limits.

Hæmatological changes (see Figure 1) appeared on the first day after operation when the proportion of lymphocytes had fallen to 1% of a total leucocyte count of 6500 per cubic millimetre. The fall in the neutrophil count was preceded by the appearance of increasing numbers of multilobed forms. Monocytes and eosinophils were absent from the peripheral blood from the second to the seventh day after operation, but rose to normal proportions thereafter. Her serum bilirubin level reached 5.2 mg. per 100 ml. on the fifth day after operation, but fell to less than 0.1 mg. per 100 ml. prior to her discharge from hospital. The serum uric acid level gradually fell from 5.5 mg. per 100 ml. on the second day to 0.8 mg. per 100 ml. on the seventh day. The excretion of urine was undiminished at any stage; but the specific gravity remained constant at 1.010 for the first ten days after operation. Albuminuria was only occasionally noted.

Sternal marrow biopsy on October 15, 1959, showed the erythrocyte, granulocyte and platelet precursors to be normal. The proportion of plasma cells was slightly increased, and several had multiple vacuoles in their cytoplasm.

On November 20, a blood count gave the following findings; the leucocytes numbered 6800 per cubic millimetre with normal distribution and morphology; the hæmoglobin value was 15.3 grammes per 100 ml.; platelets were plentiful. The total serum protein content was 8.3 grammes per 100 ml. (4.5 grammes albumin, 3.8 grammes globulin). Paper electrophoresis showed the gamma globulin fraction to be increased and all other fractions to be normal.

Discussion.

The use of autogenous marrow replacement is the most satisfactory of the marrow infusion procedures, as the problem of an immunological response by the recipient or by the marrow does not arise. In the case reported, it was expected that, though disseminated foci of melanoma might exist in the marrow, it would not be diffusely involved. Marrow puncture previously had not revealed malignant cells; also it is known that even when malignant cells are injected intravenously, the number that form metastases is very small (Roberts *et alii*, 1958).

Although the palliative effects of this procedure cannot be gauged with accuracy, it is encouraging to note that this patient has gained weight and feels well. The hæmorrhagic episodes which occurred on the twenty-third day after operation, in the absence of any biochemical or hæmatological abnormality, and in two unrelated areas, are thought to be due to sloughing of tumour tissue, as a recorded fatality following massive dosage of alkylating agents has been attributed to hæmorrhagic necrosis of visceral metastases (Westbury *et alii*, 1959).

It had been intended to protect the spleen from the effects of the alkylating agents by tying off the gastro-splenic vessels, clamping the splenic artery and delivering,

distal to the clamp, a transfusion of oxygenated blood during total-body nitrogen mustard perfusion. The presence of a large melanomatous deposit in the spleen precluded this procedure in this case.

Acknowledgement.

We are indebted to Dr. R. J. Walsh, Director of the Blood Transfusion Service, Australian Red Cross, N.S.W. Division, for his valued advice and assistance; also to Miss S. Bowman, of The Unit of Clinical Investigation, Royal North Shore Hospital, for the preparation of the diagrams. One of us (T. S. Reeve) is in receipt of a grant-in-aid from the New South Wales Cancer Council.

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HERPES ZOSTER OPHTHALMICUS AND PREGNANCY.

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Clinical Record.

On March 15, 1958, a female patient presented with typical herpes zoster ophthalmicus of four days' duration. The vesicles had been present for two days, and had been followed by gross secondary crusting for two days. She was treated with atropine drops and "Chloracort" ointment applied locally, and with penicillin given by intramuscular injection in a dosage of 600,000 units daily, to combat secondary infection.

On March 18, mild low-grade iridocyclitis was present, but the skin lesion was clearing. On March 24, no iridocyclitis was present, as shown by absence of keratic precipitates and of "flare" on examination with the slit lamp. At this stage the patient said that she thought she might be three months pregnant.

On April 24, the herpes zoster ophthalmicus had completely cleared, leaving several small scars above the eyebrow. Visual acuity was 6/6, and corneal sensitivity was present. The patient said that she was definitely four months pregnant. Her older child, aged two and a half years, had contracted chicken-pox on April 3, and her younger child, aged 14 months, had done likewise on April 14.

On September 28 the patient was delivered of a baby boy, weighing 8 lb. 3 oz.; his length was 22 in. She brought him to see me when he was aged three months, at my request, to have his eyes examined. They appeared quite normal, with no signs of cataract.

Discussion.

That an intrauterine infection by the transplacental route can occur when the mother contracts varicella, has been established. The incubation period is 10 to 14 days, with outside limits of 8 to 21 days. A baby contracting the disease before the tenth day may be considered to have an intrauterine infection. Enrich *et alii* (1958), in reporting a case in which signs of the disease appeared on the seventh day of life, stated that 16 cases of intrauterine infection had previously been reported. At the same time Freud (1958) reported yet another case. Since the report by Gregg (1941) in which he associated congenital cataract with rubella in early pregnancy, the incidence of other infective diseases at this time is a cause of apprehension to doctor and mother.

Summary.

A case of herpes zoster ophthalmicus in early pregnancy did not lead to any abnormality in the eyes of the baby which proceeded to a normal delivery at term.

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Reviews.

Studies on the Epidemiology of Filariasis in Central and South Pacific Islands. By Elon E. Byrd and Lyle S. St. Amant; September, 1959. South Pacific Commission Technical Paper No. 125. New Caledonia: South Pacific Commission. 7½" x 10", pp. 96. Price: 6s. (sterling).

THIS report is a revised and condensed version of a large unpublished official war-time document. It has been prepared by Dr. M. O. T. Iyengar, and is published with the permission of the original authors.

Microfilaria rates for Tonkinese (in the New Hebrides), Polynesians (Samoa), Fijians, Micronesians (Gilbert Islands) and Melanesians (Solomon Islands and New Hebrides) are presented, including results published in other war-time surveys. The microfilaria (*Wuchereria bancrofti*) rates were much the same for all these indigenous people; but the Tonkinese adults showed only infection with *W. malayi* brought with them from Asia. Periodicity studies showed that *W. malayi* was periodic, as was *W. bancrofti* in the Gilbert Islands, in contrast with the non-periodic variety of *W. bancrofti* seen in Polynesia. Observations were also made on the incidence of physical signs of filariasis. Studies on the vector mosquitoes form the bulk of the material presented: the species involved, infection rates, seasonal effects, experimental infections, habits and flight range. Finally, control measures are discussed. These, of course, were those available at the time—control of the insect vector (diethylcarbamazine has been introduced since that time). Local vector control was possible with the facilities available in war-time, but would be difficult in time of peace.

This is a valuable report, in which a considerable amount of information has been made available by the efforts of the South Pacific Commission.

There is a tendency to generalize from local samples. Although it is admitted that the term "Melanesian" is a convenient abbreviation for use in the report, this leads to the statement that "the Melanesian native did not seem in the least bit perturbed by having a dozen or more specimens (of *Anopheles farauti*) biting him about the ankles at one time". This certainly does not apply to all Melanesians. The observations were made during the period of considerable military activity in the area. This was recognized in Western Samoa where the deployment of troops considerably disturbed the peace-time equilibrium, resulting in an increase in the mosquito population. Thus the validity of applying some of the findings to peace-time epidemiology would be questionable. Again, the presentation of a ratio of 1:1 as 100:00% may make tabulation neat, but has no meaning. These, however, are minor points in a valuable contribution to the knowledge of filariasis in the area.

Metals and Engineering in Bone and Joint Surgery. By Charles Orville Bechtol, M.D., Albert Barnett Ferguson, Jr., M.D., and Patrick Gowans Laing, M.B., B.S., F.R.C.S.; 1959. Baltimore: The Williams & Wilkins Company. 10" x 6½", pp. 194, with 119 illustrations. Price: 88s.

ORTHOPAEDIC SURGEONS, during the past few years, have been making more and more use of metallic implants, either in the treatment of fractures or in the performance of arthroplasty operations. Such implants are continuously bathed in a chloride solution, and much effort has been devoted to finding suitable metals, strong enough for the purpose, yet unlikely to corrode in such a medium.

Not enough is known by most surgeons of the problems involved and of the best way to avoid the unfortunate

mishaps which occasionally occur. This little book will do much to correct this defect in our knowledge. It is obviously the result of prolonged and painstaking research, and the authors are to be congratulated on the production of a readable and well-illustrated book, in which they come to many conclusions of considerable practical value.

It is well known that two different metals, such as vitallium and stainless steel, should not be used together; but it is not so well known that different types of stainless steel should not be so used, and few surgeons realize that it is almost impossible to avoid leaving such mixtures if a screwdriver of a different metal from the screw is used, as microscopic amounts of the screw-driver remain on the screw. It is also not well enough known how easy it is to reduce the corrosion resistance of implants by careless handling. Any chipping, cracking or bending has such an effect, and microscopic damage can be caused to nails, plates and screws by being rattled around in the drawer in which they are kept; it is recommended that all such things should be kept and sterilized in cloth containers. Screws and plates should be handled only with rubber-covered forceps, and as no appliance can be inserted without being damaged in some way, none should be used twice. It is obvious that implants which are required for only a limited time, as in the plating of fractures, do not require the same meticulous care as those which it is hoped will be left indefinitely, such as a prosthesis in an arthroplasty, because such plates can easily be removed after the fracture has united, if they cause any trouble. In this regard, the authors recommend that in young people with a long expectation of life, any metal should be removed when it is no longer required, but that this is probably unnecessary in the more or less aged.

The reading of this book by orthopaedic surgeons will probably explain some of their unexpected failures in the use of metallic implants, and will help them to avoid such occurrences in the future. It may be worth mentioning that the authors reaffirm the old teaching that if it is possible to avoid the use of metal, it is probably better to do so.

Röntgen, Rads and Riddles: A Symposium on Supervoltage Radiation Therapy held at the Medical Division, Oak Ridge Institute of Nuclear Studies, July 15, 16, 17 and 18, 1956. Edited by M. Friedman, M.D., M. Brucer, M.D., and Elizabeth Anderson; 1959. Washington: U.S. Government Printing Office. 10½" x 7½", pp. 510, with many illustrations. Price: \$2.50.

THE status of the megavoltage machine in ten short years has changed from one of a research instrument proudly installed in a few fortunate hospitals to one in which "Co irradiation has already been called 'orthovoltage therapy'". With the higher output machines intensity becomes decreasingly important, because the time spent in the change-over of patients sets the pace. In considering economics, Professor Smithers thinks it important to reckon on the amount of work the machine is able to do. This factor puts the linear accelerator in a better light.

Loevinger explains that the reason for introducing the rad into radiotherapy is that the nature of the distribution of the absorbed energy is so different between supervoltage and conventional voltages that the röntgen has lost its meaning. Professor Roberts issues a warning on loose talk about calibration of dosimeters in rads. It is not possible. We can have rads only in some medium, and therefore we have to talk about air rads, water rads, tissue rads or bone rads, etc.

Supervoltage is an improved tool for radiotherapy. This volume is an important addition to the stock of ideas of one using this form of radiation. The ideas are included in excellent sections on machine design, installation problems and sources of energy, as well as on physics, biology and medicine. The scintillating discussions of some very thoughtful contributors are a joy, and the members of the Oak Ridge Institute of Nuclear Studies are to be congratulated on organizing a meeting of such valuable scientific opinion. Discussion at the end of chapters on special techniques for special tumours and clinics on unusual cases are pertinent examples.

Finally, Professor Smithers contributes a chapter on what needs to be done in radiotherapeutic research. He states that we are now equipped with suitable apparatus and a fine variety of radioisotopes in our large radiotherapy departments (referring mainly to the United States of America and the United Kingdom) at least. Further purely technical advances are not very likely to produce any marked effect on the results of radiotherapy for cancer. Along the paths of fundamental radiobiology, radiopathology

studied in the cancer patient and effective collaboration among medical consultants, considerable progress might be made.

The book is whole-heartedly recommended to those whose interests lie in radiation and cancer.

Office Orthopaedics. By Lewis Cozen, M.D., F.A.C.S.; third edition; 1959. Philadelphia: Lea & Febiger. Sydney: Angus & Robertson, Limited. 9½" x 5½", pp. 432, with 321 illustrations. Price: £5 4s. 6d.

THE fact that this concise volume has reached three editions in nine years indicates both its general appeal and the desire of the author to keep the text up to date. As is stated in the preface, its contents are directed to the general practitioner, the industrial surgeon, interns, residents on orthopaedic services and paediatricians. All of these will find it a most helpful manual in dealing with the orthopaedic problems of everyday practice, and the well-documented references may well prove useful to the specialist orthopaedic surgeon. In giving aids in diagnosis and outline of treatments, this book should be of immense help to the isolated general practitioner who has to make decisions on these problems without access to specialist services.

The dissertation on plaster technique must be of help to the junior resident medical officer or young general practitioner. If anything, this errs on the side of being over-cautious—for example, recommending the extension of all above-knee plasters to the groin; but better this fault than the reverse.

It is thought that in places some outmoded methods are still described, such as long-wave diathermy and the use of dry cuffing. Perhaps, in the next edition, these could be eliminated.

On page 86, the feet of a teen-age girl are shown and stated to be probably deformed as the result of too-short footwear. Surely the skiagrams show well-developed metatarsus primus varus—an ontogenetic condition; and the opportunity to discourse on this oft-occurring reason for bunions, despite attention to footwear, should, we believe, not be lost.

Interrogation and history-taking of the "back" patient are well discussed; this aptly brings out that all back pain is not due to a "disc". This chapter could well be a "must" for all recent graduates and for many old graduates. Whilst the author gives a good outline of the club foot and its early treatment, it is thought that more emphasis must be placed on the necessity for watching all these patients until adolescence, and on the fact that of those with the more severe types, a large number will require operative interference at the age of about ten years.

Keeping in mind the persons for whom this book is written, we believe that the method of examining a patient for tuberculosis of the spine, shown in Figure 254, is highly dangerous and should be omitted. This manoeuvre, unless most gently performed, could in a destructive lesion result in considerable harm. It is far safer to ask him to bend down and pick up a penny and observe the rigid back.

The various children's ailments and deformities are well described, and these sections will have wide appeal. So also will those dealing with the differential diagnoses of the adult afflictions of the upper and lower extremities.

The points brought out in the discussion on fracture treatment are those which require stressing, so the inclusion of this cursory section can perhaps be excused. Finally, the section on orthopaedic examinations for law courts should be of assistance to those inexperienced in court attendance.

In conclusion, this book fulfils the stated purpose of its author, and can be confidently recommended for the bookshelf of every general practitioner.

The Actinomycetes: Volume I. Nature, Occurrence, and Activities. By Selman A. Waksman; 1959. Baltimore: The Williams and Wilkins Company. 10" x 6½", pp. 340, with 107 illustrations. Price: £6 17s. 6d.

THIS volume, the first of a series on the actinomycetes, is written by a man who is the foremost authority in this field. In his preface, Waksman tells how his attention was first directed to the actinomycetes about 45 years ago, when he was a student specializing in soil microbiology. At that time they were a little-known group of microorganisms considered by some to be bacteria and by others to be fungi. Waksman in his early studies decided that the organisms could be differentiated from both bacteria and fungi, and learned later that similar suggestions had already been made by

other workers. It was not, however, until 1940 that the importance of this interesting group of microorganisms became manifest. "Only 20 years ago", writes Waksman, "scarcely a dozen laboratories in the whole world were devoting much attention to this group of organisms, and they were concerned largely with either disease-producing or soil-inhabiting forms. Today, literally thousands of investigators throughout the world are isolating cultures of actinomycetes from soil and other substrates and studying their physiological and biochemical activities. It all began with the isolation of actinomycin in 1940. This was followed by the isolation of streptothricin in 1942 and of streptomycin in 1943, and later of chloramphenicol, the tetracyclines, the erythromycins, the neomycins, novoblocin, oleandomycin, nystatin and numerous others." In this volume, the author "presents his personal experience with the actinomycetes especially their occurrence in nature, their structure and functions, and their role in natural processes. The subsequent volumes will deal with the problems of how to recognize them and how to utilize them for the production of valuable drugs". This treatise is written with admirable lucidity and precision, and is illustrated by 107 figures including many excellent photomicrographs. The type and general production of the book are very good indeed. It will become a standard book of reference on this subject.

Science News. Number 53. Edited by Archie and Nan Clow; 1959. Mitcham, Victoria: Penguin Books, Limited. 7½" x 4½", pp. 128, with many illustrations. Price: 4s.

Number 53 of "Science News" has been received. Of particular interest in it is an article by C. H. Waddington entitled "What is the Origin of Species?". Another article of interest is one on domestic synthetic detergents, which discusses among other things the public health problem created by foam from detergents in domestic sewage. An article of biological interest deals with "The Microsomal Particle: The Typesetter of the Cell". There are also articles on stereophonic sound reproduction, the tungsten filament lamp, the spinning electron, and the importance to chemistry of the theory put forward a century ago by Kekulé and Cooper. The number ends with the usual research and book reviews.

Preventive Medicine in World War 2. Volume 4: Communicable Diseases Transmitted Chiefly through Respiratory and Alimentary Tracts. Prepared and published under the direction of Major-General S. B. Hays. Editor-in-Chief: Colonel John Boyd Coates, Jr., et alii; 1958. Washington: Office of the Surgeon-General. 10" x 6½", pp. 568, with 48 charts, 91 tables and four illustrations. Price not stated.

DISASTERS, losses and harassment caused by communicable diseases in armies form an historical background to the work of all army medical services, and should impart to their efforts the preparedness and urgency called for in measures on which ultimate victory or defeat may well rest. Though such lessons are burned upon the memories of all medical officers who have actually encountered them, it is notorious that they make a less forceful impact on others. For this reason, it is important that, for the future education of those concerned, official war histories should deal comprehensively with this particular aspect of medical experience. This has been planned in the "Official Medical History of the United States Army in World War II", for which at least three volumes are proposed to cover the subject of preventive medicine.

In the first volume of this series, the difficult task of dealing with the voluminous information, gathered from the world-wide areas in which American troops served, has been commendably undertaken by a team of 21 experts in their various fields. The subject matter receives detailed treatment, and the value of the volume is enhanced, as both an historical record and an epidemiological study, by the inclusion of much well-displayed statistical information.

The book contains three main parts: a general introduction; diseases transmitted through the respiratory tract; and diseases spread through the alimentary tract. The introduction by Professor J. E. Gordon applies to the whole impact of communicable diseases, rather than to those especially named in this volume, and is an excellent monograph, indicating the problem of infectious diseases in war, and summarizing the general experience of the American armies. The diseases grouped in the two main parts are treated separately by individual authors, who usually include historical notes of United States Army experience in previous wars, experience in the various theatres of World War II, epidemiology and methods of prevention

and control, together with accounts of pertinent war-time research. There is a good deal of overlapping between sections, but this, where it serves as additional warning to future wartime readers, is not a disadvantage. A chapter on influenza is of special interest, and diarrhoea and dysentery receive the extended consideration due to their universal importance. It is noted that the incidence of the latter in the Port Moresby area has been included in a section on the Australian mainland.

The volume is an important record of contagious diseases in armies, and of great medical achievement.

Genetics and Cancer: A Collection of Papers presented at the Thirteenth Annual Symposium on Fundamental Cancer Research, 1959. Published for The University of Texas M. D. Anderson Hospital and Tumor Institute; 1959. Austin: University of Texas Press. 9" x 5½", pp. 470, with many illustrations. Price: \$8.50.

THE University of Texas M. D. Anderson Hospital and Tumor Institute has organized for some years an annual symposium of experts on some problem of cancer. In 1959 the thirteenth of these took place, and was devoted to genetics and cancer. The contributions are now published in book form, and offer 22 highly expert articles, preceded by an introduction by R. Lee Clark, director of the sponsoring University Institute, and ending with a symposium summary by Howard B. Andervont. The most original and, some will think, the most provocative article is by Professor Darlington, of Oxford—the only representative, by the way, of the British Commonwealth. He makes a bold attempt to dethrone the nucleus as the prime mover in cancer mutation; this agent, he maintains, is housed in the cytoplasm in the form of plasmagones, which have an ancestry going back to the origin of life. Plasmagones differ from viruses, but are their precursors. Mention is made of the fact that viruses cannot live apart from the cellular host, and some have brought forward this fact to support the contention that viruses have been produced by the host cells; one might as well proclaim that tapeworms have been manufactured by mammalian intestines! Plasmagones are determined by heredity, whilst viruses are distinguished by infection. Experimental proof is advanced for the view that the cell can be divided into two parts, one the agent of cancer production, which is diffusible, and the other the non-diffusible nuclear matter or collection of genes.

Three important conclusions arise from this symposium. First, inbred strains of mice have been developed and selected for cancer susceptibility—so much so that at present cancer researchers demand ample supplies of these inbred animals. It is to be noted that there is a diversity of susceptibility; one strain may be susceptible to mammary cancer induced by a virus but not by a chemical agent, another strain may show the reverse. Secondly, genetic factors control the growth of transplanted tissue. Thirdly the mouse mammary tumour virus has been discovered; this must be taken into account along with heredity and hormone factors.

Several portions of the book well illustrate the brilliant triumphs of organic chemistry in establishing constitutional formulae. Thus deoxyribonucleic acid, DNA, is convincingly proved to consist of two helical polynucleotide chains wound round each other, whilst ribonucleic acid, RNA, is a linear single strand molecule.

One criticism may be levelled at this book—namely, indifferent editing; there are no cross references, and opinions lacking convergence or even consistence are published without editorial comment. Thus William J. Schull is a "doubting Thomas" regarding the importance of heredity in human cancer, and refuses to accept Professor Darlington's dismissal of the nucleus in favour of plasmagones. This is not a book for the medical practitioner or for the medical student; its appeal will be appreciated only by those few who are in the front firing line of virus research.

Right-Left Discrimination and Finger Localization: Development and Pathology. By A. L. Benton, Ph.D.; 1959. New York: A Hoeber-Harper Book. 9½" x 6", pp. 200, with illustrations. Price: \$7.00.

APART from the usefulness of this monograph in summarizing and evaluating previous work—the author's own and that of most other investigators—on the components of Gerstmann's syndrome, it has wider application to psychological theory. It explores an aspect of the development of symbolic thinking in the child, and in its comparative studies of normal and mentally defective children it would seem to have links with the Russian work of A. R. Luria. As an explanation of the Gerstmann syndrome and of many related behavioural deficits which occur with lesions in this area, Benton suggests that the primary disturbance is a

failure in symbolic formulation, in so far as this affects a suggested right-left gradient in the body schema. This primary failure causes the related deficits.

Benton's studies of the development of right-left discrimination in children—the growth from simple own-body to complex other-person discriminations—have led him to incorporate within the concept of a general body schema an initial motor-sensory schema with a right-left gradient. This is present in the child only as a vague awareness of laterality and is at first not verbalized. As discrimination develops and becomes more complex, the importance of the efficient symbolic formulation increases.

Benton illustrates that in patients with cerebral lesions both the degree and quality of right-left discrimination and finger agnosia vary. He suggests that this reflects disturbances in language function at different levels of symbolic formulation, and highlights the importance of lesions in the dominant hemisphere. In a group of children who made consistent reversals in right-left discrimination, a relatively large number, compared with a control group, exhibited definite retardation in language function and disability in reading. We should like to know whether they also made many reversals when writing, or whether their consistent reversals in verbal concepts of right and left were unrelated to this not uncommon phenomenon in the young child, which disappears at about the age of seven years.

In perspective, the study may be regarded as a further thoughtful and accurate attempt to break down another small facet of disturbed human behaviour into something, like aphasia, which can be diagnosed, analysed and measured. Any such study is a welcome addition to neurological progress and the wider body of biological knowledge.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Treatment of Urinary Lithiasis", compiled and edited by Arthur J. Butt; 1960. Springfield, Illinois, U.S.A.: Charles C Thomas. 10" x 6½", pp. 600, with many illustrations. Price £8 8s.

"Body Fluids in Surgery", by A. W. Wilkinson, Ch.M., F.R.C.S.E., F.R.C.S.; Second Edition; 1960. Edinburgh and London: E. and S. Livingstone, Limited. 8½" x 5½", pp. 288, with 12 illustrations and 30 tables. Price: 21s. 6d. (English).

"Diagnosis in Locomotor Disorders", by Kenneth Stone, D.M. (Oxon.), M.R.C.P.; 1960. London and Melbourne: Oxford University Press. 8½" x 5½", pp. 230, with 53 illustrations. Price: 41s. 6d.

"The Author Publisher Printer Complex", by Robert S. Gill; Third Edition; 1958. Baltimore: The Williams and Wilkins Company. 7½" x 4½", pp. 146. Price: 24s. 9d.

"An Introduction to Congenital Heart Disease", by Leo Schamroth and Fay Segal; 1960. Oxford: Blackwell Scientific Publications. 8½" x 5½", pp. 128, with 82 illustrations. Price: 22s. 6d. (English).

"Aids to Biochemistry", by S. P. Datta, B.Sc., M.B., B.S. and J. H. Ottaway, B.Sc., Ph.D., A.R.I.C.; Fifth Edition; 1960. London: Baillière, Tindall and Cox. 6½" x 4", pp. 264, with 29 tables and 41 illustrations. Price: 15s. (English).

"Glaucoma: Transactions of the Fourth Conference, March 8, 9, and 10, 1959, Princeton, N.J.", edited by Frank W. Newell, M.D.; 1960. New York: The Josiah Macy, Jr. Foundation. 9" x 5½", pp. 260, with 108 illustrations. Price: \$8.00.

"Science News No. 54", edited by Archie and Nan Clow; 1960. Mitcham, Victoria: Penguin Books Limited. 7" x 4", pp. 134, with many illustrations. Price: 4s.

"New Biology No. 31", edited by M. L. Johnson, Michael Abercrombie and G. E. Fogg; 1960. Mitcham, Victoria: Penguin Books Limited. 7" x 4", pp. 158, with many illustrations. Price: 4s.

"Atherosclerosis and Body-Build: With Special Reference to Size and Number of Subcutaneous Fat Cells", by Per Bjurulf. Supplement 349; 1959. Stockholm: Acta Medica Scandinavica. 9½" x 7", pp. 100, with 31 illustrations. By subscription.

"Essential Tremor: A Clinical and Genetic Population Study", by Tage Larsson and Torsten Sjögren; Supplement 144; 1960. Copenhagen: Acta Psychiatrica et Neurologica Scandinavica. 9½" x 6½", pp. 176, with many tables and illustrations.

"Epidemiological Methods in the Study of Mental Disorders", by D. D. Reid, M.D., D.Sc., M.R.C.P.; World Health Organization Public Health Paper No. 2; 1960. Geneva: World Health Organization. 8½" x 5½", pp. 80. Price: 5s. (English).

The Medical Journal of Australia

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SURGERY IN GENERAL PRACTICE.

THE problems associated with surgery in general practice in Australia have been under serious consideration for some time, and more particularly since they were raised in these columns over three years ago.¹ It was then suggested that the matter could be profitably discussed at a round table conference of the Royal Australasian College of Surgeons, the Australian Faculties of the College of General Practitioners (the Australian College of General Practitioners had not then come into being) and the Post-Graduate Federation in Medicine, and that the British Medical Association might consider taking the initiative in the matter. As a direct result of this, so far as we know, the College of General Practitioners in Australia expressed interest, and the Federal Council of the B.M.A. called a conference of the parties mentioned. Results have not been startling, as there seems to have been a good deal of inertia in the matter, but some progress has been made. A statement prepared by Dr. L. R. Mallen, Chairman of Council of the Australian College of General Practitioners, and published in this issue (see page 79) sums up the present position.

This is a difficult subject, but a satisfactory solution to it is of major importance in the future development of medical practice in Australia. For that reason a strong moral obligation rests on all those concerned to put aside sectional interests and to think of it constructively. That there are several points of view, reasonable in themselves but mutually conflicting, cannot be denied. The ideal of the Royal Australasian College of Surgeons that all surgery should be performed by competent surgeons is most laudable. The claim of general practitioners that freedom of practice must not be restricted other than by the judgement and conscience of the individual practitioner is fundamental. At the same time the patient has every right to choose his own doctor and to take it for granted that he will receive competent treatment whether he is in the heart of the city or far in the outback. Certain points are clear to those who have eyes to see: first, the surgeon with higher qualifications is not always available in an emergency, and even without an emergency, distance may make the cost of bringing him and the patient together prohibitive; second, all general practitioners are not competent surgeons, despite the fact that they may hold

the degree of bachelor of surgery; third, a general practitioner who is told that he must eschew non-emergency surgery and is given no training in it, and is at the same time expected to deal with the occasional emergency that may test the skill of the best surgeon, is not to be envied; fourth, a good deal of routine surgery can be done competently by a doctor with aptitude and a moderate amount of training. If these points are acknowledged frankly by all concerned and reactions are moulded by common sense and a good conscience, a practical solution to the problem should be possible. The solution does not lie in ineptly worded articles by petulant anonymous surgeons in women's magazines, and we hope that there will be no more such nonsense to bedevil the situation. One hesitates also to accept that surgical audit schemes on the State level, such as have been hinted at recently in Queensland² and New South Wales,³ are practicable or desirable, however valuable they may be as a domestic matter within a hospital. The common sense and realistic answer to the problem would still seem to lie in the provision of training in surgery suitable for general practitioners and at the same time the building up of a strong climate of opinion in the profession against those, whether they have higher qualifications or not, who undertake surgery outside their field of competence.

JUBILEE OF THE OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES.

THE Ophthalmological Society of New South Wales is this year celebrating its jubilee, and we offer to the Society and its members our hearty congratulations. According to a paragraph in the *Australasian Medical Gazette* of August 20, 1910, the Society was born on July 11, 1910. The paragraph (page 441) may be quoted in full as a matter of interest:

Ophthalmological Society of N. S. Wales.

At a meeting held in Sydney on July 11th it was decided to form the above-named society. The following officers have been elected:—President, Dr. Odillo Maher; Vice-president, Dr. F. Antill Pockley; treasurer, Dr. R. H. Jones; secretary, Dr. Cyril Shepherd; members of council, Dr. Gordon Macleod and Dr. Halliday. Any member of the New South Wales Branch of the B.M.A. is eligible for election. The annual subscription was fixed at half-a-guinea. Meetings for the exhibition of cases, reading of papers, etc., will be held on the first Wednesday of each quarter, but owing to the first week in October being unsuitable, the first meeting will take place on the last Wednesday in September.

With the possible exception of the Pædiatric Society of Victoria, which traces its lineage to the Melbourne Pædiatric Society (founded in 1906), the Ophthalmological Society of N.S.W. is, so far as we know, the oldest surviving specialist medical group in Australia, and it still flourishes. When the Ophthalmological Society of Australia (B.M.A.) came into existence in 1938, the Ophthalmological Society of N.S.W. was not swallowed up and lost in the larger body, but retained its identity. By a happy symbiosis it continues to do so and thus has attained venerable stature.

In passing it may be noted that the Ophthalmological Society of Australia (B.M.A.) has the distinction of being

¹ *MED. J. AUST.*, 1957, 1:515 (April 13).

² *Sun-Herald*, June 19, 1960.

³ *Sydney Morning Herald*, June 21, 1960.

the oldest Australia-wide specialist medical group within the British Medical Association. As a sequel to certain necessary amendments to B.M.A. rules, it was decided by ophthalmologists attending the Adelaide congress in August, 1937, that they should form the first special section to comprise the whole of Australia, and so the Ophthalmological Society of Australia (B.M.A.) was conceived. It came to birth at a specially convened meeting in Sydney on March 23, 1938. It is not, however, the oldest Australia-wide special group, as the Australian Orthopaedic Association was formed on April 27, 1937, and the Urological Society of Australasia on January 7, 1937. Both were formed outside the British Medical Association and regrettably have remained extramural bodies.

Current Comment.

PARAPLEGIA IN CHILDREN.

The newer knowledge about paraplegia which has accrued in the past fifteen years has been derived largely from experience with adult patients; relatively few reports concern children.

THESE are the opening sentences of a paper by P. L. Norton and J. J. Foley,¹ of the Massachusetts Hospital School, in which they review their experience with 65 paraplegic children, in 48 of whom the lesion was congenital (spina bifida) and in 17 of whom it was acquired at ages ranging from birth to 17 years. The subject is of particular importance because of the revolutionary change in the prognosis of such lesions which has taken place in the past 15 years. R. Jaeger,² in 1953, in a review of congenital spinal meningocele, based on an analysis of 68 case histories, stated that he could not locate a single one of these patients in whom the condition was associated with complete bladder paralysis who had survived the first 10 years of life. On the other hand, S. S. Bluestone and G. G. Deaver,³ in 1956, reporting their experience in the rehabilitation of children of various ages up to 17 years, with varying degrees of motor and sensory paralysis due to spina bifida and myelomeningocele, state that such children "can become useful, independent and self-supporting members of the community". As Norton and Foley point out, this apparent discrepancy is largely accounted for by the fact that Jaeger wrote as a neurosurgeon, who saw these patients during the first few months of life, while Bluestone and Deaver were dealing with survivors who had been referred to a centre for physical medicine and rehabilitation. However, it also highlights the fact that, even when Jaeger wrote, the few such patients who had survived into their teens had done so as the result of skilled and devoted care and a considerable measure of good luck, whereas Bluestone and Deaver's paper heralded an era in which it is possible to lay down fairly well defined rules for the management of such patients, and in which the facilities and guidance available, though certainly not universal, have enormously improved. Formerly everything depended on the resourcefulness and ingenuity of individual practitioners and the courage and devotion of parents and nurses, but now there are, or should be, centres where treatment and advice are available from personnel specially skilled in the management of such cases.

Norton and Foley write from such a centre. Most of their patients were admitted after they had reached the age of five years, but the youngest was received in the second year of life. They admit that mortality is high in the early years of life, but state that, in their experience, the

life expectancy of those who survive this early period is surprisingly good if urological care is adequate. Their paper deals with two major topics: first, the prognosis for life and self-sufficiency, and second, the requirements for orthopaedic care. It is pointed out that in formulating a policy for the long-term management of paraplegic children it is necessary to have a clear idea as to the prognosis for life and ultimate self-sufficiency. Of the 48 children with congenital paraplegia, the basic lesion in every case was spina bifida, and all but two had complete bladder paralysis; these two had acquired successful bladder control after several years of training. The great majority had complete or nearly complete paralysis of their lower limbs, and many had extensive paralysis of the lower part of the trunk as well. Forty-one of these patients were still alive, their ages ranging from seven to 30 years. Of the seven who had died, five had done so between the ages of 11 and 13 years, the other two in their middle twenties; in each case the primary cause of death was chronic pyelonephritis with uraemia. Norton and Foley comment that these figures indicate that children with congenital paraplegia who survive the early years of life have a far better chance of reaching adult life than is generally believed. They then point out that, after the expectancy of life itself, the next most important consideration is the patient's prospect of walking independently. They state that, as a general rule, a child with total paraplegia should be regarded as capable of learning to get about efficiently with the help of crutches and braces. Twenty-six of their patients had qualified in this respect, and were on a programme of full activity without using a wheel-chair at all; others were expected to reach this standard in time. The maximum distance which such a patient is expected to travel at one time is about a quarter of a mile. It is clear from these figures that, apart from those with impaired mentality or with an extreme physical handicap, plans for the treatment and training of such children should from an early age be governed by the expectation of a life long enough to require a gainful occupation.

In discussing the orthopaedic care of paraplegic children, Norton and Foley emphasize that the problems encountered are quite different from those arising in the treatment of paraplegic adults. This is because the presence of extensive paralysis during the years of active growth is very liable to result in serious skeletal deformities. This fact is well recognized in the literature dealing with poliomyelitis, and Norton and Foley comment that the literature on childhood poliomyelitis is in some ways a better guide to the orthopaedic management of paraplegic children than most of the literature on paraplegia itself. The variety of orthopaedic problems which may arise is obviously very great, and some aspects of these are discussed by Norton and Foley. They also comment on some of the underlying principles. In the first place, the paraplegic child seldom presents a single orthopaedic problem; his deformities are often multiple, and these should be considered in their totality before any corrective surgery is done. Three principal factors are mentioned as being responsible for the differing orthopaedic requirements between adult and child paraplegics. First is the fact that, in addition to joint contractures, which may occur at any age, deformities in the gross structure of bones and joints are prone to develop in children, although unlikely to occur in adults. Second is the presence of easily damaged epiphyses and the relative fragility of the long bones in these children, together with the lack of pain sensation, which make "conservative" treatment of joint contractures by passive stretching likely to be much more hazardous than operative correction. Thirdly, since nearly all paraplegic children should be regarded as potential walkers, every effort should be made to prevent and correct deformities which may interfere with walking, and extensive surgery is often justified to this end. Finally it is emphasized that deformity *per se* is not an indication for corrective surgery; the aim is efficient ambulation. For example, though 14 hip-stabilizing operations were performed in the series under consideration, many other patients had dislocations of the hip, and some with bilateral dislocation of the hip had very good function without corrective surgery. Spinal fusion was performed only three times in

¹ *J. Bone Jt Surg.*, 1959, 41-A: 1291 (October).

² *J. Amer. med. Ass.*, 1953, 153: 792 (October 31).

³ *J. Amer. med. Ass.*, 1956, 161: 1248 (July 28).

this series, but Norton and Foley give reasons for thinking that this should be done more often, and that if it is to be done, it should be done early. However, they also point out the difficulties and hazards associated with this operation in such patients.

In the smaller series of 17 children with acquired paraplegia, experience was essentially similar. As a group they did not have quite so good a record in learning to walk as the congenital paraplegics, and their requirements for orthopaedic surgery were considerably less. This latter feature was considered to be largely due to the relative maturity of the skeleton before the onset of paralysis. However, this group was really an intermediate one, as most of these children had reached their teens before paralysis occurred.

On the important question of the subsequent fate of such children, Norton and Foley have some interesting information. They had kept track of all but one of their patients, and they give details of all the 19 who had passed the age of eighteen years. Three had since died, but of the remaining 16, 11 were gainfully employed, some in positions of responsibility. However, as an indication of the type of occupation considered suitable, it is interesting to note that six had been trained as watch repairers. Nine were classed as being totally self-supporting, and four were married.

In their final comments Norton and Foley point out that it is reasonable to anticipate that in the future there will be an increasing number of paraplegic patients, particularly in the younger age groups. The reasons for this are as follows: (i) It is still true that the percentage of congenital paraplegics who survive infancy and early childhood is small; it would require only a very moderate success on the part of the medical profession in solving the crises of this early period to double the number of those reaching rehabilitation centres. (ii) There is at present no prospect of reducing the number of injuries which cause paraplegia, and it is probable that the proportion of patients who survive such injuries will increase. (iii) In both congenital and acquired paraplegia, increasing initial survival rates and increasing longevity will have a cumulative effect, and more such patients will be alive at any given time. Norton and Foley join Bluestone and Deaver in their plea for greater interest in paraplegic children in their need for comprehensive care, and in the problems relating to them which still remain to be solved. While Norton and Foley write primarily from the orthopaedic angle, they point out that urological and nursing care, physical therapy, neurosurgery and general surgery, as well as formal education and vocational training, are all important, and that these activities are not ancillary, but essential in their respective spheres. Their paper is a stimulating and thought-provoking contribution for all who are responsible for the care of paraplegic children.

THE AETIOLOGY OF CARDIAC INFARCTION.

THE output of article and discussion on the causation of atherosclerosis shows no sign of abating, and yet we do not appear to be very much nearer a final answer to the question: "What causes heart disease?" Nevertheless, the considered statement on the aetiology of cardiac infarction, contributed by Professor J. Yudkin, of London University, as a guest editorial in a recent issue of the *A.M.A. Archives of Internal Medicine*,¹ is interesting as the opinion of a competent authority on the present state of knowledge on the subject. Yudkin begins by pointing out that a doctor confronted with a patient is under pressure to provide treatment, and that he may therefore feel compelled to translate into specific measures the most tentative suggestions put forward by the clinical research worker. If he thus prescribes restriction of animal fats and administration of corn oil to a patient after a first attack of cardiac infarction, this may turn out to be the most appropriate effective treatment, but Yudkin states that

the existing evidence on this question is very tenuous. Yudkin then notes the widespread belief that there is a simple progression, leading directly from faulty diet to cardiac infarction. According to this belief, in the wealthier countries many diets include excessive amounts of saturated fats and deficient amounts of unsaturated fats. This is said to result in an abnormally high level of cholesterol in the blood, which leads to atheroma, with the coronary arteries tending to become narrowed and finally occluded, either by the atheroma itself or by a blood clot. Yudkin states that it is now clear that such a simple hypothesis cannot be sustained. Consumption of saturated fats does raise the blood cholesterol level, and consumption of unsaturated fats does lower it. However, a high blood cholesterol level does not necessarily mean increased atheroma. That atheroma will lead to cardiac infarction has also not been established. The aetiology of coronary infarction has been confused by unwarranted assumptions and extrapolations, and this confusion extends into the diagnosis of coronary disease. It is impossible actually to diagnose atheroma of the coronary arteries in the living subject, and it may be misleading to include cases of angina pectoris in statistics of cardiac ischaemia. Yudkin quotes Morris and Crawford as stating that a patient with angina pectoris tends to have less cardiac infarction rather than more; heavy physical work tends to bring on the symptoms, thereby protecting the heart from infarction. The diagnosis of coronary thrombosis as a cause of death is itself by no means infallible, so that statistics must be viewed with caution.

Statistics also, though they are of value, by no means support any simple dietary hypothesis. In Britain, different occupational groups rather than differences in diet tend to show appreciably different mortality rates from coronary disease. The argument that coronary disease is caused by a deficiency of the essential fatty acids, deduced from the fact that administration of oils such as corn oil causes reduction of raised blood levels of cholesterol, is not proved. It is also not proved that the result of this reduction will be a decreased likelihood of cardiac infarction. Pre-occupation with diet and dietary fat has resulted in less attention being given to other possible aetiological factors, such as smoking and a decreased amount of physical activity. Conflicting evidence has been presented concerning the influence of mental stress, obesity and physical build. The only generalization which can be applied is that cardiac infarction is associated with what we have come to call high living standards. The available evidence points to a multifactorial aetiology of cardiac infarction; some of these factors may be predisposing, and others may be precipitating ones. Whether infarction of a part of the myocardium occurs will probably depend, among other things, on the patency of vessels, the extent of the coronary anastomoses and the ease with which formed fibrin can be lysed. It may be that the aetiological factors which today appear only vaguely and occasionally related to cardiac infarction, are really of a second order. Thus, the association of cardiac infarction with mental stress is at least partly due to the fact that the occupations of greater responsibility are those of lower physical activity. Similarly, a great deal of the dietary evidence points to over-eating in general rather than to excessive or deficient intake of particular nutrients.

Yudkin suggests that the doctor can help in the matter of treatment in two ways. As regards prophylaxis, the family physician can stress the importance of physical activity and moderation of dietary habits. Especially he should advise the avoidance of overweight. The best way to do this is by restriction of carbohydrate only; this not only controls weight most easily but also limits fat intake. As regards treatment of the patient already known to have hypercholesterolaemia or to have suffered from cardiac infarction, Yudkin sees no objection to the restriction of saturated fats and the administration of corn oil. It may do good. But he pleads for recognition of the fact that present dietetic therapy is based on expediency rather than science, and asks that doctors should receive with open minds more logical measures as soon as they become available.

¹ *A.M.A. Arch. intern. Med.*, 1959, 104: 681 (November).

Abstracts from Medical Literature.

PHYSIOLOGY.

Movement of Electrolytes Across the Wall of the Urinary Bladder.

A. RAPOPORT, T. F. NICHOLSON AND E. R. YENDT (*Amer. J. Physiol.*, January, 1960) have investigated the transfer of certain electrolytes (Na^+ , K^+ , Cl^- , H^+) through the wall of the isolated urinary bladder in the dog. When test solutions are introduced into the bladder, changes in the concentration of these ions occur in the direction of their concentration gradient with plasma. The magnitude of these changes depends chiefly upon the magnitude of the concentration gradient, but is influenced, as well, by the time the solution is allowed to remain in the bladder, by the pH of the solution and probably by its volume. By the use of radioactive sodium it has been shown that sodium moves through the bladder wall in both directions at the same time. The movement of electrolytes into and out of the bladder appears to be passive. It is reaffirmed that the urine in the bladder need not be identical with the urine as it leaves the kidney.

Effect of Mercuric Chloride in Some Kidney Enzymes.

V. SHORT AND B. SHORE (*Amer. J. Physiol.*, January, 1960) report that rats given a diet of sucrose and vitamins for three weeks or more develop a tolerance to mercuric chloride greater than that of chow-fed rats. Comparison of several enzyme systems (tricarboxylic acid cycle, succinic dehydrogenase, cytochrome oxidase, α -ketoglutarate dehydrogenase, alkaline phosphatase, cathepsins and β -glucuronidase) in chow-fed and sucrose-fed rats indicated no significant differences in activities. After the intravenous injection of 3 mg. of mercuric chloride per kilogram, notable differences in the extent of inhibition of tricarboxylic acid enzyme systems were observed. Twenty-four hours after such an injection, kidneys of chow-fed rats were seriously hampered in their ability to perform biological energy transformations. Oxidation and phosphorylation by sucrose-fed rat kidneys were considerably less inhibited.

Polyurethane Aortic Grafts.

B. DREYER, T. AKUTSU AND W. Z. KOLFF (*J. appl. Physiol.*, January, 1960) report that membranes and abdominal aortic grafts made of polyurethane vinyl chloride and of polyurethane foam were inserted in 35 dogs. The reaction of the tissues to polyurethane was studied and the functioning of the aortic grafts with smooth internal surfaces (membrane form of polyurethane) was compared with that of those with spongy internal surfaces (foam form of polyurethane). Polyurethane vinyl chloride membrane became encapsulated by an envelope of fibrous tissue and appeared to lose some strength inside the body, but fibrous tissue grew into polyurethane foam, strengthening it. The nine smooth grafts made of polyurethane vinyl chloride membrane all became thrombosed, but 80% of the foam grafts remained open. This confirmed the

observation of other workers that a smooth internal surface is undesirable in arterial transplants. The grafts of polyurethane foam functioned well as aortic replacements. They have many of the requirements of an ideal arterial transplant and are being studied further.

Alveolar-Capillary Temperature.

E. RUBENSTEIN, R. C. PARDEE AND F. EDWARDS (*J. appl. Physiol.*, January, 1960) report that human experiments have been done to test the thermal homeostasis of the alveolar-capillary structures. Under ordinary room conditions, the temperature of tidal air was raised to 37.7° C. while the air was still in the small bronchi. The hyperventilation of such air did not measurably influence right atrial or "wedged" pulmonary arterial temperature. The breathing of air chilled to 5° C. had no discernible effect on the temperature of brachial or carotid artery blood. The experimental data and mathematical calculations based on physical constants indicate that human alveolar temperature is virtually constant even under the most extreme thermal conditions.

Tactile Discrimination and Skin Temperature.

K. A. PROVINS AND R. MORTON (*J. appl. Physiol.*, January, 1960) report experiments in which 10 subjects immersed an index finger in water at 0.75° C. for 40 minutes. Two-edge threshold discrimination was tested during cooling of the finger and subsequent spontaneous re-warming due to cold vasodilatation. There was a marked deterioration of tactile discrimination at finger skin temperatures below about 8° C., although the curve showing the mean decrease of numbness with increasing skin temperature was displaced relative to the curve showing the mean increase of numbness with decreasing skin temperature. Tactile discrimination was also tested on five subjects at each of six water bath temperatures (2°, 4°, 6°, 8°, 15° and 30° C.). At each temperature the finger was immersed for 20 minutes and the finger circulation arrested after the first five minutes. There was little impairment of two-edge discrimination after 15 to 20 minutes' immersion of the finger at temperatures of 6° C. or higher. At 4° C. there was marked impairment, and at 2° C. all subjects experienced complete numbness at the test site.

Arterio-Venous Fluoroscopy in the Lower Limbs.

J. PIERI, J. CASALONGA AND C. AMBROSI (*Presse méd.*, July 25, 1959) describe a new fluoroscopic technique for investigating the arterio-venous system of the lower limbs. Five histamine weals are first raised on the limb, and then a needle is inserted into the internal saphenous vein. Ten millilitres of a 5% solution of fluorescein are then injected into the femoral artery, and the limb is examined in a dark room with Wood's light. The time taken for the histamine weals to become visible and the time required for fluorescence to appear in the internal saphenous vein are then measured on a metronome. The authors found that in normal subjects the two periods were equal, and were less than 22 seconds.

When the fluoroscopic time is normal and the result of the arterio-venous test is increased, early arterial damage may be postulated. When the two periods are increased, then diffuse, massive lesions are present in the arterial tree. The authors state that they have found arterio-venous intervals ranging from 35 to 120 seconds and more.

Ulnar Nerve Conduction Velocity and "H" Reflex in Infants and Children.

J. E. THOMAS AND E. H. LAMBERT (*J. appl. Physiol.*, January, 1960) report that measurements of conduction velocity of the motor fibres of the ulnar nerve in the segment between the upper part of the arm and the wrist were made in six premature infants, 42 full-term newborn infants and 98 children up to the age of 14 years. In premature infants, 21 to 40 days before full term, values ranged from 18 to 22 metres per second, with a mean of 21. Full-term newborn infants had velocities that ranged from 21 to 33 metres per second, with a mean of 28. The values in the newborn were about one-half those of normal young adults, which range from 47 to 73 metres per second, with a mean of 60. By the age of three years almost all values were in the lower part of the adult range, and at five years the velocities were not significantly different from those of the adult. These observations are in harmony with information about the diameter of nerve fibres during growth in man. The "H" reflex could be elicited by stimulation of the ulnar nerve in almost every newborn infant. By the age of one year and thereafter, it could rarely be elicited. Between the elbow and the wrist afferent fibres subserving this reflex conducted with a mean velocity of 30 metres per second. Data on the action potential of the hypothenar muscles, residual latency of conduction in the ulnar nerve, latency of the "H" reflex, and conduction in the peroneal nerve in infants and children are compared with those on adults.

Dental Changes Induced by Exposure to Adverse Environments.

N. O. HARRIS, R. B. MEYER, JR. AND S. R. RESTIVO (*Amer. J. Physiol.*, March, 1960) report that the histological and chemical composition of teeth were examined from rats acclimatized for 18 to 24 weeks to cold (3° C.), at neutral (24° C.) temperatures, or to heat (36° C.), at barometric pressures of either 750 or 380 mm. of mercury. There were negligible histological changes in cold alone, but altitude induced changes in the mesenchymal element of the teeth. These were made more severe by superimposed cold, but superimposed heat counteracted some of these effects. In the latter group, however, there were ectodermal changes. Chemical studies on these teeth revealed significantly reduced concentration of calcium, phosphate and magnesium in the altitude-exposed and heat-exposed rats. The cold acclimatized rats, as was also the case histologically, did not differ from the controls. Protein and iron content did not differ significantly among the groups. There were significant changes in the ratios of calcium, magnesium and phosphate. Possibly the

basic inorganic composition of the teeth of altitude-acclimatized rats was changed since the calcium:phosphate ratio was low. X-ray diffraction failed to confirm this.

Effects of Position on Expiratory Reserve Volume.

A. B. CRAIG (*J. appl. Physiol.*, January, 1960) reports that the expiratory reserve volume (ERV) reflects the resting position of the lungs and thorax and is the most variable subdivision of the lung volume. It was confirmed that the ERV decreased when the subject changed from the sitting to the supine position. When the subject's elbows were supported on the arms of the chair, the ERV increased 3-1% and a further increase was noted when the subject leaned forward in the sitting position. The maximum ERV was recorded in the hands-knee position. To explain these changes, the effect of the weight of the shoulder girdle and of the abdominal contents must be considered. There may also be other effective elastic forces in the abdomen in addition to those elastic forces contributed by the lungs and thorax.

Lung Volume of Singers.

S. S. HELLER, W. R. HICKS AND W. S. ROOR (*J. appl. Physiol.*, January, 1960) state that lung volume determinations (tidal volume, inspiratory capacity, inspiratory reserve volume, expiratory reserve volume, vital capacity, maximum breathing capacity, functional residual capacity, maximum breathing capacity, functional residual capacity, residual volume, and total lung capacity) were carried out on 16 professional singers and 21 subjects who had had no professional vocal training. No differences were found between the two groups of subjects, whether recumbent or standing, which could not be explained upon the basis of age, size, or errors involved in making the measurements.

THERAPEUTICS.

Electroshock Therapy and Tranquillizers.

S. LESSE (*J. Amer. med. Ass.*, August 8, 1959) discusses electroshock therapy and tranquillizing drugs. One hundred and seventy patients whose mental illness had not been relieved by tranquillizing drugs were given electroshock therapy. These patients were incapable of social or vocational occupation. One hundred and seventeen of these patients had satisfactory results with electroshock therapy. Some patients were given tranquillizing drugs, chlorpromazine mainly, but promazine, prochlorperazine, perphenazine, reserpine and meprobamate were also given in large doses. A usual dose of chlorpromazine was 1000 mg. daily, and other drugs were given in proportionate doses. Sixty-eight patients received 3000 to 8000 mg. of meprobamate a day. In many patients tranquillizing drugs were given first, and if the result was not satisfactory electroshock therapy was given alone. If this did not cause sufficient improvement, tranquillizing drugs and electroshock therapy were given at the same time, often with benefit; tranquillizers did not reduce the number of electroshock treatments or

decrease apprehension before treatment, but they did help agitated patients.

A New Anorectic Agent.

S. C. FREED AND E. E. HAYS (*Amer. J. med. Sci.*, 1959) report on a trial of a new non-amphetamine anorectic agent, 2-phenyl-tert-butylamine resin ("Ionamin"), for the purpose of weight reduction. A series of 178 patients were the subjects of the trial, and a weight loss of approximately 0-25 lb. per patient per day was obtained. Dosage ranged from 15 to 60 mg. per day, and a significant therapeutic response was obtained at all dosage levels. It appeared that a 30 mg. dose of "Ionamin" was somewhat superior to a 15 mg. dose of dextro-amphetamine. The authors conclude that "Ionamin" effectively suppresses appetite and does so with a significantly lesser incidence of side effects than is experienced with equivalent therapeutic doses of amphetamine. They state that patients whose weight had "plateaued" while they were taking other anorectic agents responded satisfactorily to this drug.

Oral Antidiabetic Therapy.

R. H. WILLIAMS, R. H. POLLEN AND R. H. BARNES (*Ann. intern. Med.*, December, 1959) discuss oral antidiabetic therapy and state that this is a worthy objective provided it appropriately controls the metabolic alterations of diabetes. The advantages must outweigh the disadvantages. Three sulphonylureas have offered promise: tolbutamide, chlorpropamide and metahexamide. They presumably lower the blood sugar level by stimulating increased insulin secretion and by decreasing hepatic glucogenesis, particularly in the presence of insulin. The greatest effect is noticed in patients who most nearly approach normality in the amount of assayable insulin in the plasma and pancreas. These tend to be elderly individuals with stable diabetes of recent onset. A poor response is apt to be obtained in depancreatized patients, and in diabetes that is unstable or of long duration, or requires large insulin doses, or is prone to produce keto-acidosis. Side effects with tolbutamide have been few and mild. Chlorpropamide and metahexamide have caused side reactions more frequently and occasionally have produced jaundice. Tolbutamide, chlorpropamide and phenethylbiguanide all have value in the treatment of some diabetics. More orally effective compounds will be provided, but they must be evaluated objectively, with attention to their effects not only on the levels of glucose in the blood and urine, but also upon many phases of the metabolism of carbohydrates, fats and proteins, as well as their effect on general health with prolonged usage.

Strontium Lactate in the Treatment of Osteoporosis.

F. E. McCASLIN, JR., AND J. M. JAMES (*Proc. Mayo Clin.*, June 24, 1959) report on a small series of patients with osteoporosis who have been treated with strontium lactate. The idea that strontium lactate might be a useful adjunct in the treatment of osteoporosis arose from a report by Shorr and Carter that strontium increases the retention of calcium, and that when maximum normal calcium absorption level is reached, retention of strontium increases in its

turn, and further administration further heightens the retention of both elements. The authors state that their clinical impression has been that patients so treated have improved both subjectively and objectively, and that to investigate this they have undertaken a study to compare the patients' subjective complaints, the physical findings, and the skiagrams of the spinal column before and after a course of treatment with strontium lactate. Out of 72 patients so treated, 32 were available for follow-up study, and some details of these are given. Twenty-two were treated with strontium lactate alone, and 10 were treated with a combination of strontium lactate, oestrogens and testosterone. The dosage of strontium lactate was 6-4 grammes daily in divided doses. Of those treated with strontium lactate alone, 18 experienced marked subjective improvement in their condition, and four obtained moderate improvement; of those treated with hormones and strontium lactate, nine experienced marked subjective improvement. The authors conclude that although the mechanism of action of strontium lactate in the treatment of osteoporosis remains to be elucidated, the therapeutic value of the drug appears to be established.

Pernicious Anemia.

F. H. BETHEL et alii (*J. Amer. med. Ass.*, December 12, 1959) present a report on the present status of the treatment of pernicious anemia on behalf of the U.S.P. Anti-Anemia Advisory Board. They state that more than a decade of experience has amply confirmed the belief that parenterally administered vitamin B₁₂ is as effective as injection of purified liver extract of equivalent vitamin B₁₂ content, in the treatment of pernicious anemia. Patients who receive injections of appropriate amounts of vitamin B₁₂ in either form at regular intervals remain in hematological remission, and do not develop neurological or gastro-intestinal manifestations of the disease. The authors state that, on the other hand, the treatment of pernicious anemia with orally administered substances presents a complex problem, and that several considerations have led to the fear that such products may not always provide adequate treatment for patients with pernicious anemia. In some instances there may be an initial satisfactory response to treatment with orally administered preparations, but this may be followed by a recurrence of symptoms, in spite of the continued administration of the same preparation. There is evidence that this is the result of acquired refractoriness to certain intrinsic factor concentrates derived from animal sources. The authors conclude that in the management of a disease for which parenteral therapy with vitamin B₁₂ is completely adequate and wholly reliable it is unwise to employ a type of treatment which is, at best, unpredictably effective. Finally, they state that the Sixteenth Revision of the U.S. Pharmacopoeia, which will become official late in 1960, will not include preparations for the treatment of pernicious anemia by oral administration. The U.S.P. unit will cease to exist, and the Anti-Anemia Preparations Advisory Board, having no further function, will be disbanded.

Brush Up Your Medicine.

OTITIS EXTERNA.¹

Otitis Externa Circumscripta.

Ætiology and Clinical Notes.

OTITIS EXTERNA CIRCUMSCRIPTA is usually an acute localized infection, e.g., furuncle or infected sebaceous cyst. It is fairly common, occasionally recurrent and rarely associated with boils elsewhere on the body. Pain is severe, especially on moving the pinna.

The external auditory canal is swollen and may be closed, with resultant obstructive deafness.

Sometimes there is post-auricular swelling; therefore acute mastoiditis must be kept in mind.

The pre-auricular glands are often tender.

The type of discharge is important in differential diagnosis. With a furuncle it is thick and creamy from the start and is often blood-stained at first. With acute mastoiditis it is usually viscid and "ropy" at the start, and thicker later; in addition there are signs and symptoms of the accompanying otitis media.

Organism.

Staphylococcus aureus is always present.

Treatment.

Heat and sedatives are basic.

The following could be a typical regimen of treatment: (a) Cleanse the canal, under direct vision and with care; syringing is often too painful. (b) Insert a wick saturated with Polymyxin B sulphate or dilute acetic acid (1 part to 20 parts of water); this is very good after rupture to prevent recurrence. (c) Prescribe chloramphenicol drops for patient to use over the wick. (d) Remove wick (patient can do this) two days later. (e) Continue chloramphenicol drops (10% in propylene glycol) for one week. Observe and treat daily. Alternatively use polymyxin B sulphate as 0.1% drops. (f) Apply boric acid ointment (10%) after infection subsides; or bacitracin and neomycin sulphate ointment can be considered.

Glycerine and ichthylol or aluminium acetate wicks are useful; they must be fine and inserted under direct vision. If pain is severe, use fine cotton wool and not gauze.

Incision and drainage are rarely necessary nowadays and may even be detrimental. In any case this would require a general anaesthetic.

Short-wave diathermy is occasionally used.

Antibiotics (systemic) are usually necessary.

Never use penicillin drops or powder because of the risk of allergy.

Indications for Antibiotic Therapy.

Systemic administration of broad-spectrum antibiotics is necessary, usually on account of severity of pain and the urgency of instituting an intensive régime of treatment.

In most cases it is neither possible nor desirable that one should wait for pus to form to get a swab before therapy is commenced.

Antibiotic of Choice.

Chloramphenicol or one of the tetracyclines (given orally), depending on clinical judgement and experience, is the antibiotic of choice.

Bacitracin, neomycin sulphate and polymyxin B sulphate are excellent, either as ointments or as drops.

In most cases this treatment will be successful.

The unsuccessful minority will be recurrent infections and will require culture and sensitivity tests.

The local use of penicillin, streptomycin, the tetracyclines and sulphonamides in the ear has been abandoned.

Remarks.

The condition is common during the bathing season. A course of injections of staphylococcal toxoid may be necessary.

¹No. 2 of a series of synopses prepared by Dr. Alex Johnson in collaboration with the Australian College of General Practitioners. Each synopsis has been submitted for approval to a leading member of the College, to a professor of pharmacology and to a specialist in the field concerned.

The main objectives in treatment are: (a) Relief of pain and discomfort during the acute stage. (b) Clearing the external auditory canal. (c) Elimination of causative organism. (d) Restoration of normal function and healthy skin in the canal. (e) Prevention of recurrences.

Boric acid ointment (10%) is an excellent prophylactic for acute external otitis during the bathing season.

Otitis Externa Diffusa.

Ætiology and Clinical Notes.

Otitis externa diffusa is usually chronic, may be recurrent and often is a complex ætiological problem. Many cases are dermatological entities and often occur in a patient with allergy.

It is frequently accompanied by post-auricular intertrigo. Many of the infections are secondary to a seborrhoeic condition of the skin and scalp. Some are neurogenic in origin. Infection may spread from allergic reaction and dermatitis causing skin cracks.

Probably 15% of the cases seen by specialists are fungoid otitis externa in which the external auditory canal is filled with wet "blotting paper" debris and pus.

The external auditory canal and tympanic membrane are inflamed.

Herpes zoster arises as a virus infection of the geniculate ganglion (Hunt's syndrome). Herpetic vesiculation occurs on the drum, the meatal walls and occasionally the pinna.

In external otitis the dermatological picture is greatly modified by individual susceptibility, allergic reaction and environment.

On occasions it is primarily an infective process.

Organism.

Pseudomonas aeruginosa (*Bacillus pyocyaneus*) occurs in at least 40% of the lesions—note the greenish discharge with distinctive odour.

Staphylococcus aureus and *albus*, *Streptococcus* and *Proteus vulgaris* all occur at times.

Mixed infections are common. *Escherichia coli* and enterococci produce pus and an unpleasant odour. Fungous infections (*Candida albicans*) occur. *Aspergillus fumigatus* occasionally is a secondary invader.

Treatment.

Aluminium acetate (8%) wicks are very good if inserted gently.

Nitromersol disinfecting solution ("Metaphen") or thiomersal ("Merthiolate") are useful preparations for fungi or pus.

Moist compresses of alibour water or eusol are helpful.

Useful antipruritics are: (a) Local: Iodochlorhydroxy-quinolone ("Vioform") cream; crothamiton ("Eurax"); hydrocortisone (1%) ointment with or without neomycin sulphate (0.25%). (b) General: Antihistamines.

Sedation may be necessary, especially if there is an associated neurodermatitis.

Glycerine and ichthylol wicks still have some popularity.

Calamine lotion is useful.

Antibiotic therapy may be necessary.

Careful ear toilet and repeated observation together with alteration of treatment based on observation are most important.

The ears are syringed, as necessary, with a mild acid solution, e.g., dilute acetic acid (5%).

An ear can be syringed with safety at all times except after head injury or if the patient has a very painful furuncle in the external auditory meatus. This is the simplest and most efficient method for the busy general practitioner. The ear must be dried out carefully after syringing.

In keratitis obturans the ear is filled with desquamated skin. It will not be cleared up by syringing, but needs instrumental removal and skin antiseptics to prevent secondary infection. It occurs mostly in the broncho-sinus group of diseases.

Indications for Antibiotic Therapy.

Indications for antibiotic therapy depend on ætiology: culture and sensitivity tests are required.

Systemic antibiotic therapy is seldom necessary.

Care must be exercised in choice of an antibiotic for local application because of the danger of precipitating or at least aggravating local allergic reactions.

Antibiotics of Choice.

If local application becomes necessary, the antibiotics of choice will depend on culture and sensitivity tests and will rarely be those that can be administered systematically.

Ps. aeruginosa (*B. pyocyaneus*) infections usually respond readily to polymyxin B sulphate applied locally with aluminium acetate wicks.

Bacitracin and neomycin sulphate are useful in some cases, as also is chloramphenicol.

N.B. The predominant organism may change and necessitate further swabs for culture and sensitivity testing. Otitomycosis may result from the misuse of antibiotics applied locally to the ear.

Remarks.

This condition is more prevalent in the humid environment of the tropics and subtropics. When seborrhoea is the underlying cause, this should be dealt with and water kept out of the meatus as far as possible.

Ear picking may be a predisposing factor.

Most cases of otitis externa are of external rather than internal origin, except those secondary to middle-ear disease. Never use repeated applications of powder in the external auditory canal and permit the formation of a soft plug, which causes irritation as well as obstruction.

It is commoner during the bathing season. Swimming is thought to be a causative factor. Careful drying of ears after bathing and prophylactic application of methylated spirits or "Metaphen" are useful, especially in those with congenitally narrow or osteomatous canals.

There is a tendency to relapse, especially in humid climates.

Granulations from a denuded area of skin often block the ear and seem to be more common nowadays. They are probably due to a combination of factors: (a) Over-use of antibiotics; (b) inability or disinclination to use a frontal mirror properly, and therefore (c) failure to carry out adequate early toilet. Until the granulations have cleared, nothing will eradicate the infection.

ALEX JOHNSON.

British Medical Association.

VICTORIAN BRANCH: SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on February 18, 1959, at the Medical Society Hall, 426 Albert Street, East Melbourne. Physiotherapists were also present.

Manipulation.

DR. J. S. COLLINGS read a paper entitled "Techniques of Manipulation" (see page 55).

DR. W. E. SWANEY read a paper entitled "Manipulative Technique" (see page 60).

DR. R. E. SKINNER said that he was glad to see the subject of manipulation brought to the light of day, as many patients, particularly of the "sporting fraternity", had gone to osteopaths for attention. The manipulation technique of osteopaths had to be personally experienced to be appreciated; their deftness of technique was remarkable compared with what he had seen performed by his medical colleagues, and he thought manipulation should be incorporated in the medical curriculum, as it was important in practice.

MR. STILLWELL, a physiotherapist, said that he felt that he had some ability as a manipulator, and he had learnt his technique in the Physiotherapy School in Melbourne. Manipulation was an art as well as a general skill, and not everybody had that "something" that made a good manipulator. The osteopaths and chiropractors manipulated without inhibitions, and although they had successes, they also had disasters. He had followed Cyriax's writings, and no doubt some of his ideas were very successful, although he gave no

real reason for them. Mr. Stillwell said that in many cases of low-back pain and other conditions the diagnosis lacked certitude, and until the pathology of those conditions had been established, he did not consider that there would be much progress in manipulative technique. He himself had had considerable success, he did not know why, in using the Cyriax "quick thrust" with sudden sharp extension of the spine.

DR. SWANEY, in commenting on Mr. Stillwell's remarks, said that when scarring had become avascular, stretching of the scar by manipulation gave relief.

DR. M. O. KENT HUGHES said that he was interested particularly in Dr. Collings' technique of cervical manipulation, which gave great relief in many cases. He was sure that many patients remained unrelieved because the medical profession did not realize what could be done by manipulation, of which very little was taught in the medical course. If students and doctors could be trained in the methods, they would have a better appreciation of what the physiotherapists could do.

DR. COLLINGS, in reply to the question whether there was a better technique than extension-manipulation in treatment of sacro-iliac strain, said he could not visualize such a condition, as the sacro-iliac joint was a stable joint and diagnosis of sacro-iliac strain an admission of defeat and inability to reach a diagnosis. Sacro-iliac strain as such he did not think existed.

DR. SWANEY, in reply to a question on how an ankle should be manipulated, said that a lot of ankle pain was in the lateral ligament, and in manipulation that ligament should be stretched. He treated those patients under anaesthesia, and with the heel held in the hand, thrust the foot backwards.

DR. J. J. WOODWARD said that his experience was at variance with that of some of the speakers. The mental attitude and physical fibre of patients were important, and while the result of manipulation in cases of low-back pain in private patients was good, in workers' compensation cases it was bad, and in repatriation patients and New Australians manipulation was useless. In low-back pain, including sciatica, whilst he admitted that the diagnosis of disk prolapse was not 100% valid, he thought that 90% of patients with pain below the knee and paraesthesia had prolapsed disks. He found that such patients did well with manipulation despite the views of other speakers. What were the alternative methods of treatment? First, laminectomy. He was not keen to offer such treatment; it was drastic, and three to four months elapsed before return to work was possible. Second, a back brace. Application of a back brace for six weeks was relatively useless. Third, physiotherapy. He favoured physiotherapy as a first choice, but not for long periods; if there was no improvement in from two to three weeks, the case should be reviewed and manipulation under general anaesthesia performed. What was there to lose by that? Some people spoke of terrible results—for example, foot-drop—but that occurred without manipulation. Others said "It makes it worse". That might be so; but if so, the patient probably required a laminectomy anyway. He could not follow the reasoning that it was wrong to use general anaesthesia to obtain muscle relaxation, and he thought manipulation of the ankle should be a routine procedure after a Pott's fracture.

MISS MCARTHUR CAMPBELL, a physiotherapist, said that as a child she had lived in a mountain village in Switzerland, where there was an hereditary bone-setter, whose children brought pig trotters to school and constantly played with them—they were learning to use their hands. She considered manipulation to be an art and not as easy as it looked, and hoped that more medical men would learn more of the subject.

DR. BRYAN KEON COHEN said that he was not an enthusiastic manipulator, but he agreed with a great deal of what Dr. Woodward had said. He himself did not get good results from manipulation with disks and leg pain, and reserved manipulation for cases in which physiotherapy had not produced results. He used general anaesthesia, as it was a much quicker method of obtaining relaxation than prolonged use of heat and massage. He said he had seen Barker demonstrate in London in 1937—his explanations were ludicrous, but his physical power was frightening.

DR. COLLINGS, speaking in reference to the use of general anaesthesia for manipulation, said that it was a matter of world-wide controversy. He himself was biased, because patients he saw who had undergone manipulation under general anaesthesia complained of increased pain. He said that the working man with the "bad back" frequently

presented also a mental problem; he should be treated as an entity, and unless that was done the medical profession was not contending with the problem.

AUSTRALIAN RHEUMATISM ASSOCIATION: PARR RHEUMATIC PRIZE.

The Parr Rheumatic Prize, a bequest in the will of the late L. J. A. Parr, administered by the Australian Rheumatism Association (B.M.A.) and the Dean of the Faculty of Medicine, University of Sydney, is to be awarded every three years for "the best contribution to rheumatic research throughout Australia" in the preceding three years. The first award will be made at the end of 1960, and on this occasion will be valued at 50 guineas. Further details concerning the prize and the method of submission of entries will be published later.

VICTORIAN BRANCH: SECTION OF PREVENTIVE MEDICINE.

The next meeting of the Section of Preventive Medicine of the Victorian Branch of the British Medical Association will be held on July 14, 1960, at 4.30 p.m., in the Medical Society Hall, 426 Albert Street, East Melbourne. Dr. Lois Anderson will speak on some aspects of preventive medicine in Maryland, U.S.A. Her talk will place special emphasis on maternal and child welfare work.

Hospitals.

THE DESIGN OF A LARGE MODERN GENERAL HOSPITAL.

From every point of view, a hospital is a complicated, highly specialized functional structure. It must be designed for its various facilities, instead of having the facilities forced into certain areas because of a desire to produce some particular architectural appearance.

Hospital planning has registered more advancement in the last decade than in any other period in the past. Hospitals are the most complex of modern buildings. Their design demands the attention of many specialists in the fields of medicine, architecture and engineering. Each of them must have a thorough appreciation of the functional aspects of the section in which he is asked to advise, and a definite understanding of what is expected of him. There can be no better way of supplying this than by issuing a programme.

The programme should set down in detail the number of beds to be provided, the various services to be offered, the requirements of each department and the size and type of staff to be employed. In programming, building design, structural engineering, landscaping, interior design and often furnishing have to be taken into account. The people involved in drawing up the programme for the hospital must analyse the external influences which will affect its character, the particular circumstances which combine to determine its general form and the details of subdivision and equipment. The first category covers such things as population growth, number of beds, health statistics, main roads and so on. The second is concerned with the specific needs of the hospital, covering everything from the placing of the buildings on the site and their relationship to each other, right through to settling the external appearance of each unit. The third is self explanatory.

Hospital buildings should be designed for flexibility and future expansion. The structural engineer should ascertain whether this expansion will be vertical or horizontal. Future vertical expansion is most critical in the design of foundations, and it will require that all footings must be proportioned to support this anticipated load.

Ultimate success in planning, from the point of view of convenience and economy of operation, largely depends on the assessment of relationships between the various departments. The idea of relating parts is necessary in any major planning scheme in order to hold them together, rather than that they should be seen as isolated units.

The principal facilities to be provided for are the medical and nursing groups. The other major sections are administration, feeding and servicing. In smaller hospitals these various parts run very much into each other; but in a large one they must be more highly organized and, therefore, more clearly defined.

Attention must be paid to traffic circulation throughout the building. The main traffic streams are as follows: (i) incoming patients, who must proceed from the admission departments to the patient areas, emergency room, X-ray department or other services; (ii) out-going patients, who leave the hospital usually through the business office; (iii) interdepartmental patient traffic; (iv) deceased patients, who must be taken direct to the mortuary in as unobtrusive a manner as possible; (v) visitors, who should be under surveillance to and from patient areas and during their entire stay in the hospital; (vi) out-patients, if any, who may be routed to the laboratory, pharmacy, X-ray or physical therapy units, or to other services in the hospital area proper; (vii) staff members, who should pass the physician's in-and-out board; (viii) employees, who must be routed past their time-control station and locker rooms before being allowed in the hospital proper; (ix) supplies, foods and wastes, which must be completely separated as far as possible from all patient and visitor traffic. The service sections of the hospital can be designed only when all this has been taken into account.

The normal distribution of patients in general hospitals is as follows: surgical, 40% to 50%; medical, 20% to 25%; obstetrical, 12% to 25%; paediatric, 10%; miscellaneous (including eye, ear, nose and throat), 9% to 15%. Of course, this distribution of patients varies, and it differs completely if the hospital specializes in particular cases.

Whatever the case, all major hospitals have wards for many of their patients. In these the needs of the patients should be given priority, although nursing conditions must also be considered. Standardization of wards is desirable. If the shape of the building will allow, all wards, with minor exceptions, should follow the same pattern. The simplest way of achieving this result is by placing them exactly one above the other. In many of the latest hospital buildings this layout has been adopted with great success. But in this case a nursing question arises. The objective is that two groups of wards shall be controlled by one senior sister. It is based on two units, each of 32 beds, making a total of 64 beds. That is regarded as a very suitable number of people to be effectively controlled by one person.

Now, reference should be made to the medical aspect of the building, and more particularly to those departments in which the doctor's work predominates—the out-patient department, X-ray department, physiotherapy department, pharmacy department, operating block, after-care ward and casualty department. The dependence of the various medical functions upon each other is important. They should be close to each other. One solution is to group them all on one or two floors. This layout has great advantages, in that it brings all departments in this field contiguous to each other, and so avoids much walking and use of lifts.

Ideally, the average 100-bed general hospital needs facilities for from five to ten operations daily. This means three operating theatres, substerilizing rooms and scrub-up facilities, clean-up room, anaesthesia equipment room, laboratory, darkroom, instrument room, doctors' locker room, nurses' locker room, closets, central supply facilities, and recovery room. Larger hospitals should have proportionately more facilities.

Maternity service facilities should be planned in a "dead end" area, and so located that future building expansions will not make them a traffic thoroughfare. Delivery rooms should be provided in the approximate ratio of one for every 20 maternity beds or fewer, regardless of how small the hospital. There should be about double the number of labour rooms.

The nurseries should be situated in the maternity section, but outside the delivery suite. They should be accessible to visitors who wish to observe the infants through view windows. These should be arranged so that visitors viewing the infants do not obstruct traffic. There should be no entrance to the nursery from the corridor. Controlled access through the nurses' station or anteroom is preferable.

The casualty department should be placed so that patients arriving by ambulance may have direct access to the casualty room. It should be planned and equipped as a minor operating room.

Where an out-patient department is planned, an estimate should be made of the number of patients expected.

There is an average of one out-patient visit for every 3.5 occupied beds in existing hospitals with regular out-patient services. Normal arrangement will require the following: a waiting room; facilities for admission; appointments and cashier; a controlling entrance to clinical sections and medical social service room; a clinical section with examination rooms; dressing rooms; treatment rooms; dental and other specialty rooms as required. There should be convenient access, without undue traffic from the out-patient department through the hospital, to the pharmacy, radiology, laboratory and physical therapy and rehabilitation areas.

The administration section should be situated on the ground floor. The main lobby and waiting room should be convenient to the stairs, corridors and lifts, and also to the administration office. This section should include: main lobby and waiting room, information and switchboard, admission office, business office, administrator's office, matron's office, board room, gift shop and toilets.

The hospital's catering system is best provided for by a centralized kitchen for all food services and washing of crockery and cutlery. One of the best hospital kitchen designs is that based on the flow system, by which uncooked food enters on one side, passes through various preparation bays and eventually arrives at the servery, where the cooked food is loaded into trucks and distributed through the institution by lifts, dumb waiters and service corridors. Kitchen stores can be placed along the kitchen's periphery easily accessible to supply trucks.

During planning, early consideration should be given to whether air-conditioning should be installed in the hospital building. The practice in overseas countries regarding air-conditioning varies greatly according to the climate. In America, the air-conditioning of public buildings is almost universal. Of course, economics comes into the matter. I think it inevitable that, as time goes on, all public buildings in Australia will be provided with air-conditioning, both heating and cooling. I think, also, that it will be provided whenever it can be afforded in private homes. As everybody knows, certain places are always air-conditioned. The main parts of a hospital from this point of view are the operating blocks and the sick babies' wards—these are vital. In some hospitals, air-conditioning is installed in out-patient departments where there are concentrations of people. I believe that if air-conditioning can be installed, it should be installed as far as possible; but, of course, installation is enormously expensive. As far as I know, the only completely air-conditioned hospital in Australia is at Broken Hill, and there is an almost completely air-conditioned hospital at Footscray in Melbourne.

Owing to the nature of the function of a hospital, its structure should be made as safe as possible. Structural safety can be assured by the application of the design standards and regulations ordinarily used by the structural engineering profession. Fire safety can be achieved by making provisions for structural resistance to fire and to the spread of fire. This is best obtained by the use of incombustible materials and approved methods of construction for all structural members throughout the hospital. The use of combustible materials for the building finish and trim should be restricted to the fewest possible locations. A skeleton structural frame of concrete or steel is universally used for all larger hospital structures and is recommended as equally suitable for smaller hospitals.

A nurses' home is a very necessary adjunct to the hospital proper. The major needs of such a building are as follows: (i) It should have easy access to and from the hospital, but should not be so close as to jeopardize the essential feeling of separation. (ii) For the sake of nurses and visitors, the section housing them should be clearly defined and of pleasing appearance. There should be only one entrance. (iii) From a nurse's point of view, the things which really matter are the desire to maintain her individuality, her own room and quietness when it is wanted, especially if she is on night duty. The permanent staff, a number of whom spend many years in the same room, look for the same things, but with a little more space. (iv) Although the teaching section has no direct relationship to the nurses' home, it is an advantage if it is adjacent. Its requirements resemble those of other schools, but with some special features particular to the nursing profession.

The whole home should be designed to have a strong domestic character, so that it is a pleasant place in which to live. It should also combine well with the main hospital block to form a dignified and satisfying group.

It has been customary for the nurses' bedrooms to be placed like hotel rooms each side of long corridors. I believe

that this fails to give the feeling of domesticity which is so desirable. Recently a new arrangement has been designed, based on the flat idea. In this there is only one long corridor on each floor, known as the spine, and off this open a series of multi-bedroom blocks or flats, each complete with its own sitting room and toilet. Where this type of layout has been used, nurses have been delighted with the result, because it gets away from the dormitory system and creates a more intimate atmosphere.

The public rooms and amenities should all be isolated on the far side of the spine corridor in this design. The following facilities are necessary in the home: lobby and reception room with public telephone, powder room in lobby area, coat room and toilet for men visitors, small parlours, information and control office with locked mail boxes and package-receiving room, library, lifts, personal laundry facilities, kitchenettes, and adequate amusement areas and food service facilities.

The minimum requirements of the teaching section are a science laboratory, a dietetics laboratory, a nursing arts classroom and an ordinary classroom, a lecture hall and a library.

In planning a hospital, provision must also be made for external traffic. This includes provision for the following: patients arriving or leaving by car or ambulance; patients arriving or leaving on foot; adequate parking space for visitors; convenient parking for staff; controlled ingress and egress of employees; delivery of incoming supplies; removal of the dead in an unobtrusive manner; the delivery of fuel and removal of refuse; and out-patient traffic. Where there is room, the internal roads plan should be in accord with the needs of all traffic. Functions and beauty should be reconciled. The architect should think of the landscaping and internal roads and paths as part of the building problem.

LEIGHTON IRWIN,
Melbourne.

Medical Matters in Parliament.

HOUSE OF REPRESENTATIVES.

The following extracts from *Hansard* relate to the proceedings of the House of Representatives.

May 10, 1960.

Employment of Physically Handicapped Persons.

MR. McCOLM: My question, addressed to the Minister for Supply, refers to the current programme of junior chambers of commerce to encourage industry to employ physically handicapped persons. As the Department of Supply is a large employer of labour—particularly of manual labour—in its munitions and other factories, can the Minister inform the House of his department's policy concerning the employment of such persons?

MR. HULME: Upon my appointment to the portfolio of Supply some eighteen months ago, I undertook an inspection of the various factories which are administered by the department. During those inspections I noted that quite a number of physically handicapped persons were employed. On inquiry from the head of the department I was informed that at that time approximately 100 were employed. It has been the policy of the department, during the war years and subsequent to that period, to employ as many physically handicapped persons as possible. I think that the department is to be commended, as also are the Ministers who were previously in charge of the department, for adopting this attitude towards these unfortunate persons.

Pharmaceutical Benefits.

MR. McIVOR: Will the Minister for Health inform the House whether chemists have been instructed by their guild that when making up a prescription they must mark the prescription with a code mark indicating the price charged so that, in the event of the prescription being presented anywhere in Australia, the same price will be charged? Is it true that when a doctor prescribes a proprietary medicine which can be purchased anywhere under its correct name, the guild requires the chemist to remove the label, replace it with his own and add a surcharge for doing so, although he already is making a large profit in supplying the medicine which has been prescribed? Will the Minister agree that actions of this kind eliminate competition, create monopolies and allow the people to be exploited sinfully?

DR. DONALD CAMERON: I think that a good deal of what the honorable gentleman has asked me is covered by State legislation. As to the matter of marking prescriptions, the Commonwealth is concerned only with the price which the chemist charges under the *National Health Act*—the price which has been arranged between the Commonwealth and the Pharmaceutical Guild. Throughout Australia pharmaceutical benefits cost the public only 5s. Any other charges which the chemist makes are his own concern and are in no way under the control of the Commonwealth Government.

Out of the Past.

CAPTAIN N. R. HOWSE, V.C.¹

[From the *Australasian Medical Gazette*, September 20, 1901.]

THE following is an extract from the *London Gazette* of June 4th, 1901.

"Victoria Cross—The King has been graciously pleased to signify his intention to confer the decoration of the Victoria Cross upon the under mentioned officer for his conspicuous bravery in South Africa as stated against his name: *New South Wales Medical Staff Corps*—Captain N. R. Howse. During the action of Vrededorp on the 24th July 1900, Captain Howse went out under a heavy cross fire and picked up a wounded man, and carried him to a place of shelter."

Correspondence.

MEDICAL PRACTICE AND THE FUTURE.

SIR: One could feel that monetary transactions have no place in medical practice. That a general practitioner should not look after more than 300 families, and should be assisted by several nurses on his staff. That all staff, equipment, offices, car, etc., should be provided by the Government. That the doctor should be a civil servant with the same independence as regards his judgement and actions as judges have in a court of law. That he should have a 35-hour working week, paid sick leave, annual holidays, long-service benefits, shared superannuation, 14 days' post-graduate study each year with travel, accommodation and some social functions at public expense. That every doctor should be able to attend two conventions per year in addition at public expense in his individual fields of interest at his choice. That he should have the opportunity to undertake a journey around the world with his family every seven years at public expense to do post-graduate study at recognized international institutions at his choice. That he should have all other benefits public servants enjoy.

That where the population is larger, medical units should be centralized on a regional basis with the senior general practitioner head of each unit. That other services, such as baby health, health inspector, physiotherapists, almoners and medical specialists should be part of these regional units. That general-practitioner hospital beds should be attached to these regional units, where the family doctor continues to look after his patients. That, where necessary, patients should be transferred to specialist hospitals at the discretion of the family doctor and the patient. That specialists should be full-time and separately registered on a population quota system. That no specialist should be permitted to prescribe treatment or express official opinion unless the patient was referred by the family doctor (emergencies excepted).

That the training of doctors should split at the M.B., B.S. level into future general practitioners and future specialists. That the future general practitioner should get a broader academic diet at this stage, including family and national budgeting and economics, domestic technology, sociology, hospital and general practice experience, culminating with a research thesis in a recognized research institution inquiring into some aspects of general practice, and that

this training should be equivalent to a specialist. Future general practitioners will have to be skilled interrogators, able to crystallize key symptoms out of patients' complaints and feed them into diagnostic electronic computers, which, in combination with the results of continuous morbidity research, will provide them with reasonable estimates of probabilities to guide them into the choice of further investigations and measures to be taken. They will have to be artists, almost engineers and economists to assess the reasonable demands of treatment.

That disciplinary control and administration of medical services should be in the hand of the medical association, who should become an autonomous public body responsible only to the minister.

That if a nominal charge was to be made for attendances, it should be payable to the Government, not to doctors.

That all free drugs and medical aids, etc., be distributed from government stores to the medical units. One record only to be kept for each item. If in a small unit the doctor dispenses himself, no prescription would be necessary. Where there was a dispenser, prescribing by code would suffice. That where the minister could not provide sufficient money for certain treatment, it should be limited by expert regulation of the medical association, which, if desirable, should explain its policy to the public. No political make-believe.

That the energy now wasted on monetary transactions (Government subsidies, claims, insurances, accounts, etc.) and in duplication and lack of coordination, be used for the building of roads, schools and research.

I am putting this scheme up without regard to reality, expedience or popularity, to pose it as the true challenge of nationalization. The drawback of our present national health scheme is, of course, that its weak link is the general practitioner. General practice, while definitely having its own problems like a special field, and needing probably the highest degree of post-graduate training of all specialties, is looking after about 80% to 85% of our national health problem outside major hospitals and outside "official" medicine. I do not see how this situation can significantly be remedied on the present trend of diminishing private fees. Who will, in the near future, be able to afford appropriate post-graduate training and travel out of the income of a general practitioner? How few can do so now? Should it be that Mr. Citizen would rather pay taxes than higher private fees? Has public attitude not changed, in the sense that there is now a "right" to health for everyone, rather than health be an article that must be bought, like in a shop, according to one's means? Could the stimulus of financial gain not be replaced by education? Should doctors continue to have a shorter expectation of life? I think we, as an association, should give these matters thought, and especially as general practitioners should develop a vision of future better services. Is it desirable that doctors, patients and chemists must spend a multiple of time that actual medical service involves in filling in forms and claims to obtain subdivided payments, and that large clerical organizations must check all these claims down to grains and "the nearest penny"?

What I have just outlined may not be expedient or realistic, but what is your vision for the future?

Yours, etc.,

HANNS PACY.

Tea Gardens,
New South Wales.
June 22, 1960.

THE MANAGEMENT OF EARLY BREAST CANCER.

SIR: The two papers on this topic (*Journal*, May 21, 1960) are deserving of careful and critical digestion, coming as they do from specialists who are associated with a relatively great concentration of basic material, by all practitioners, whether they be specialists in this field or general practitioners.

The paper by T. H. Ackland, W. P. Holman, and B. A. Stoll naturally concerns particularly those in a position to manipulate the management of the disease at a relatively early stage. It is still far from clear which method of treatment produces the best results. When it is recalled that the average survival time in untreated breast cancer is about four years, it is obvious that claims for the superiority of one method over another are worth little unless they are based on a ten-year clinical cure rate. If microscopic "staging" of the disease is available, as it is with Haagenson's

¹ From the original in the Mitchell Library, Sydney.

triple biopsy, comparable analysis is even more valuable. Certain it is that the superiority of radical mastectomy with irradiation over simple mastectomy with irradiation has yet to be proved.

Further information from these authors on the following points would be appreciated:

(a) Some surgeons, impressed by cases exhibiting, after radical mastectomy, persistent lymphoedema in the limb or restricted shoulder movement feel that the morbidity associated with this operation may in fact still be sufficiently high and sufficiently incapacitating to warrant perhaps more careful choice of operation than is sometimes apparent. Comparison of the ultimate cosmetic results, and of the time required for healing in the two operations, are minor but nevertheless important considerations also. Would the authors comment on the incidence of such morbidity associated with the radical operation in their hands?

(b) It is generally agreed that the principal factor in the production of lymphoedema is post-operative infection. Claims have been made that irradiation can also cause it. Do the authors consider that irradiation can contribute in any measure towards this sometimes very distressing complication?

(c) A query arises with regard to the management of early tumours in the upper and the lower lateral quadrants of the breast. It is noted that X-ray therapy is advised by the authors in all Stage I and Stage II cases. It is appreciated that metastasis to the parasternal glands is less likely with lateral than with medial half tumours. Do the authors advocate post-operative irradiation in such cases if no microscopic evidence of axillary metastasis is found (taking into account the twenty daily visits required for treatment, the possible morbidity, and their own lack of confidence in the ability of the treatment to arrest the multiplication of cancer cells)?

The paper by Victor Stone is disappointing, in that reference to chemotherapy in palliation is so brief. It seems that this particular field of endeavour is more likely than any other to produce ultimately the most effective definitive treatment for breast cancer. Readers would have appreciated also more detailed comments from him concerning the biochemical and cytological tests as determining factors in the selection of hormone therapy, as it is hoped that by such tests scientific rationalization will supplant the existing empirical method of hormone selection.

Yours, etc.,

Clark-Hiskens Medical Centre,
Erin Street, Richmond,
Victoria.
June 22, 1960.

F. J. GRAY.

As they now stand, both the National Health Service and the Pensioner Medical Services must be regarded as *faits accomplis*; the most we could do would be to bring about minor alterations. It should, however, be possible to protect ourselves and our patients from undesirable innovations in the future.

What we and our patients have to guard against is the possibility that, by a series of gradual stages, we are converted into a completely nationalized service similar to that in Great Britain. To counter this, the following suggestions are offered.

1. The Federal Council of our Association should appoint a standing N.H.S. committee, this committee to be composed of representatives of all the specialist groups and the general practitioners, together with one or more leading pharmacists, a professor of pharmacology and such other members as are deemed necessary or desirable.

2. The Federal Ministry of Health would then be requested to submit any and all proposed modifications of the N.H.S. and P.M.S. to this committee, and the Ministry be given to understand that unless this request was complied with, the members of our Association would refuse to recognize or act upon the alterations.

3. The Committee would consider the proposals and report for or against them to our Federal Council, who, in turn, would notify both the Ministry and our members that the proposed modifications were or were not acceptable.

4. The various Branches of our Association should be required to ask their members to record a vote for or against the above proposals, or improved modifications of them, and if their vote be in favour, their undertaking to abide by and act loyally on the advice of our Council.

Past experience of postal ballots by our members have been very disappointing, only a minority of them having taken the trouble to return the ballot papers. To overcome this, it is suggested that if such a ballot is held every ballot paper should have printed very clearly on it: "All ballot papers not returned will be recorded as votes in the affirmative." This would impose a compulsion on those opposed to the proposals to record their votes, and doubtless all of them would do so.

Do I hear someone ask, how could we act to effectively refuse to accept any unacceptable modification, if an attempt were made to force it upon us? Simply refuse to write prescriptions in duplicate.

Yours, etc.,

Brighton,
Queensland.
June 17, 1960.

H. LEIGHTON KESTIVEN, Senior.

HAMMAN-RICH SYNDROME (DIFFUSE INTERSTITIAL PULMONARY FIBROSIS).

SIR: For his several comments (Journal, May 14) on our recent paper concerning the Hamman-Rich syndrome, we thank Dr. John Read, whose contributions to the study of this condition are well known. From amongst his discursive remarks, we are grateful for his drawing attention again to the group of static cases described by Scadding. We have not encountered such patients ourselves to date. We do not consider relevant, however, his reference to the response of scleroderma patients to steroid therapy. We agree, of course, with his reference to blood pH and its relation to arterial carbon dioxide content and tension, and also to the value of tests of pulmonary diffusing capacity in these conditions of alveolar-capillary block; but we have, to date, lacked the facilities for carrying out these investigations.

Table III of our paper contained typist's errors, the correct F.E.V. of Cases II and IV being 78% and 100% respectively. The other figures in the table are correct, and being obtained simply and directly, involve no mathematical inconsistencies of the type he suggests.

Yours, etc.,

61 Collins Street,
Melbourne.
June 17, 1960.

W. M. MAXWELL,
P. E. CAMPBELL.

GENERAL PHARMACEUTICAL BENEFITS.

SIR: You have printed many letters under the above heading expressing disapproval of many aspects of the service, but there has been a noticeable dearth of constructive criticism or proposal.

SIR: At an ordinary general meeting of the Kuring-gai District Medical Association last night, the twenty-five to thirty members present unanimously denounced the present agreement with the Federal Government and took the unprecedented step of requesting State Council urgently to hold a fresh plebiscite on the subject.

The agreement is to come up for ratification (after a trial period of six months) early in August. I am certain that a vast majority of the rank-and-file general practitioners of other States are also thoroughly dissatisfied with the agreement.

We suggest, therefore, that members in other States also take immediate steps to call special meetings of local associations, special meetings of State Branches, or other steps to convince their delegates to Federal Council that an overwhelming majority are against ratification, and require a fresh sane agreement to be worked out in full consultation with the profession.

Let us speak now or for ever hold our peace!

Yours, etc.,

2 Pembroke Street,
Epping,
New South Wales.
June 23, 1960.

N. F. BABBAGE.

SIR: At a recent meeting of the Kuring-gai District Medical Association, a resolution was passed requesting the British Medical Association to repeat the plebiscite on the Pharmaceutical Benefits Scheme held some few months ago.

We in Kuring-gai believe that the members of the profession have had, by now, further experience in trying to

prescribe under this dreadful scheme, and although the results of the previous plebiscite were statistically satisfactory, members should on a second occasion vote against it almost to a man.

The idea behind this request is to attempt to strengthen the hands of the representatives of the New South Wales Branch on the Federal Council. Should the New South Wales Council decide to repeat the plebiscite, all practising members of the profession are urged to register an emphatic protest in no uncertain terms against this Pharmaceutical Benefits Scheme. For it cannot be too greatly stressed that an overwhelming response to a plebiscite will indicate the profession's dread of this pernicious scheme.

Yours, etc.,

1015 Pacific Highway,
Pymble,
New South Wales.
June 28, 1960.

COLIN WARBURTON.

THE ROLE OF THE ELECTROCARDIOGRAPH IN ISCHÆMIC HEART DISEASE.

SIR: I desire to express my appreciation of the paper by Dr. J. J. Hurley and Dr. H. B. Kay on the above subject. Studies such as this, the outcome of much reading, experience and disillusion will, or should be, heeded and welcomed by those engaged in electrocardiography, a pursuit made easy these days with the acquisition of electrocardiographic equipment on a pay-as-you-earn basis. Their exhortations and warnings, implicit in the extended use of electrocardiographic machines, are timely and sweeping; and yet they reasonably and rightly observe that they have no quarrel with the use of such a hitherto "eclectic instrument as standard equipment". With added facilities, knowledge in interpretation will accrue, and a more enlightened profession will know when it can expect help from the electrocardiogram, recognize its abuse and misuse as well as its dire necessity.

The authors pose a theme for those of us sorely tried between the Scylla of the early-death claim, with its seeming obloquy, and the Charybdis of the dismay of the rejected applicant for life assurance, his anger often exacerbated by a blithe report from his personal physician.

Having in mind the time-honoured cliché "The best prophet naturally is the best guesser, and the best guesser, he that is most versed and studied in the matters he guesses at, for he hath most signs to guess by", one looks expectantly to the time when more use will be made of opinions such as those embraced in the article by Dr. Hurley and Dr. Kay. By this means, not only therapeutic management but prognostic medicine will be assisted, and action determined without the vacillation and consequent irritation that now applies.

I wonder if the authors have made use of Grant's¹ vector method to resolve further their borderline or non-specific tracings.

Yours, etc.,

W. J. McCrystal.

The City Mutual Life Assurance Society Limited,
Hunter and Bligh Streets,
Sydney.
June 23, 1960.

SURGERY AND THE GENERAL PRACTITIONER AND PROFESSIONAL UNITY.

SIR: I wish to add my protests to the article appearing recently in the *Australian Women's Weekly*, presumably written by a Sydney surgeon. He questions the general practitioner's right to perform any operation, even appendectomy or tonsillectomy, and further infers that general practitioners push patients to have operations just to increase their own finances.

The writer would appear to be a young surgeon with a new degree, who cannot understand why general practitioners are not flooding him with cases, so he may charge high fees for routine surgery.

It would be fine if every woman could be delivered by a down-town obstetrician, just as she may prefer to have all

¹Grant, R. P. (1957), "Clinical Electrocardiography. The Spatial Vector Approach".

her frocks designed by Norman Hartnell, and not bought off the hook. Good, too, it would be if we all had Rolls Royces instead of Fords and Holdens. (Wouldn't it be lovely!)

This author should be reminded that general practitioners in Australia have a B.S. degree anyway, and that you do not have to perform an operation as part of the F.R.C.S. examination.

If we general practitioners in the country have to be good enough to handle emergencies like Caesarean section, ruptured ectopic or ulcer and traumatic cases, surely we can do a little routine surgery too.

It is a little amusing, having abandoned a busy afternoon's consulting, and spent it on treating a compound fracture by operation and resuscitation, to find that next day the patient thinks he ought to see a specialist. On the medical side, I have had the experience of diagnosing and treating a diabetic coma, and then to find on the next day, after all the hard work is done, the patient again wants a specialist.

As for the charge of making a mess of surgery, he should be told that plenty of qualified surgeons have their messes too. A woman who had a partial gastrectomy in Melbourne finished up with worse symptoms and then came to me. She explained to me she told the surgeon she was improved, being afraid to complain lest he insisted on operating again for another big fee.

It is a sad state of affairs when to exalt yourself you have to abuse others. Surely in practice it is incumbent on every doctor to perform only that which he in conscience knows he can handle well.

If a country general practitioner does get a poor result from on operation or fracture reduction, he has to virtually live with it, blunting his reputation, whereas the city specialist is largely immune.

The whole of the article mentioned sought to lower the prestige of the general practitioners, who form the backbone of medical practice, and to undermine the confidence the patients have in them. The main aim of a periodical is to get copy, sensational or otherwise, and increase circulation; hence the open invitation for letters on the matter. If the author were sincere, he should have expressed his views in *THE MEDICAL JOURNAL OF AUSTRALIA*, and not sought to hide behind women's skirts. Better still, let him come to the Australian College of General Practitioners' Convention in Melbourne next October and speak, so we can all get a good look at this surgical paragon.

Yours, etc.,

CLIFFORD HUNT.

18 Main Street,
Stawell,
Victoria.
June 24, 1960.

"FINAL NOTICE."

SIR: Lest any reader failed to notice my original letter, I hasten herein to disclaim any intention of minimizing the value of the Defence Union. Rather do I make speed to acclaim its virtues, and to give due thanks to the councillors who labour without monetary reward for the prosperity of the society.

The whole substance of my contribution was that I resented, as being unusual and unnecessarily brusque, a "final notice" that is couched in the form of a "death certificate".

My suggestion is simply that the Union follows the lead of similar institutions by issuing two notices (not three as does the Union), the latter of which advises the member that he is unfinancial, and that he will be given a specified number of days in which he might rectify any unintended oversight.

Such a *modus operandi* would be cheaper than the Union's method, would not place any extra work upon the councillors, and would prove much less provocative to such members as have a sensibility of nature similar to mine.

Yours, etc.,

LESLIE J. SHORTLAND.

"Otaki",
Marrickville,
New South Wales.
June 20, 1960.

Australian College of General Practitioners.

SURGERY IN GENERAL PRACTICE.

THE following statement has been prepared by Dr. L. R. Mallen, Chairman of Council of The Australian College of General Practitioners, and is published at the request of the Honorary Secretary of the College.

At the request of the Australian Council of the College of General Practitioners, the Federal Council of the British Medical Association convened in Melbourne on December 11, 1957, a conference to discuss the surgical training of general practitioners. The conference was attended by the President of the Federal Council of the British Medical Association, the President of the Royal Australasian College of Surgeons, the President and Honorary Secretary of the Australian Post-Graduate Federation in Medicine, the Director of the Melbourne Medical Post-Graduate Committee and three representatives of the College of General Practitioners.

The College of General Practitioners made submissions to the conference as follows: (a) Some surgery must of necessity be performed by general practitioners. (b) General practitioners proposing to undertake surgery should undertake adequate training. (c) The scope and nature of such training should be prescribed by a competent authority. (d) Facilities for the prescribed training should be freely available.

The conference adopted, *inter alia*, resolutions as follows: (a) That the objective of the College of General Practitioners is to improve the standard of medical service given by its members to the community. (b) That this Conference is in favour of the general policy that post-graduate training in surgery should be made available to general practitioners in certain circumstances. (c) That the surgery to be taught should be limited to the essentials that may be required by the average general practitioner, especially in emergencies,

and traumatic surgery of all types including fractures. (d) That short-term refresher courses be provided in practical procedures, both in general surgery and in some specialties.

In addition to these resolutions, the conference made specific recommendations regarding the surgical training of general practitioners. These recommendations have been implemented to a greater or lesser degree, and it is expected that further progress will be made after a conference on post-graduate medical education, which is to be held in Sydney in August, 1960. This conference is to include a section for the discussion of various aspects of training for and in general practice.

The American College of Surgeons has laid down the criteria for the granting of surgical "privileges" in American hospitals. Dr. Paul R. Hawley, Director of the College, states (*Bull. Amer. Coll. Surg.*, 1956, 41: 206):

The measure of competence to do surgery is ability to deal properly with any situation that may be encountered in a given anatomical area. Anyone who meets this requirement is morally entitled to do surgery be he a family physician or a board diplomate. By the same token, no one is morally justified in doing surgery, if he cannot meet this requirement and this applies as well to diplomates of boards and Fellows of the College.

In the same *Bulletin*, Dr. Robert S. Meyers, Assistant Director of the American College of Surgeons, wrote:

During the 35 years of its conduct of the Program of Hospital Standardisation, the American College of Surgeons insisted that privileges be granted to doctors in hospitals on the basis of training, experience and demonstrated competence. Fellowship in the College or certification by an American specialty board should not be required for privileges in surgery. The Joint Commission on Accreditation of Hospitals, which now controls the program of accreditation has adopted this attitude.

The Australian College of General Practitioners is in substantial agreement with the criteria laid down by the American College of Surgeons, and is most active in its efforts to make available adequate training to those general practitioners who wish to undertake surgery.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JUNE 4, 1960.¹

| Disease. | New South Wales. | Victoria. | Queensland. | South Australia. | Western Australia. | Tasmania. | Northern Territory. | Australian Capital Territory. | Australia. |
|--|------------------|-----------|-------------|------------------|--------------------|-----------|---------------------|-------------------------------|------------|
| Acute Rheumatism | 1 | 1(1) | 5(1) | .. | .. | .. | .. | .. | 7 |
| Amoebiasis | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ancylostomiasis | .. | .. | .. | .. | .. | .. | 5 | .. | 5 |
| Anthrax | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Bilharziasis | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Brucellosis | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Cholera | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Chorea (St. Vitus) | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Dengue | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Diarrhoea (Infantile) | 13(6) | 13(12) | 4(4) | .. | .. | 3(3) | 1 | .. | 34 |
| Diphtheria | 1 | .. | .. | .. | 1(1) | .. | .. | .. | 2 |
| Dysentery (Bacillary) | .. | 4(4) | 1(1) | 4(4) | 2(2) | .. | 1 | .. | 12 |
| Encephalitis | .. | .. | 1(1) | .. | .. | .. | .. | .. | 1 |
| Filariasis | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Homologous Serum Jaundice | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Hydatid | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Infective Hepatitis | 49(20) | 31(17) | 9(1) | 14 | 4(3) | 1(1) | .. | .. | 105 |
| Lead Poisoning | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Leprosy | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Leptospirosis | .. | .. | 8 | .. | .. | .. | .. | .. | 3 |
| Malaria | .. | .. | 2(1) | .. | .. | .. | .. | .. | 2 |
| Meningococcal Infection | 1 | .. | .. | .. | 1 | .. | .. | .. | 3 |
| Ophthalmia | .. | .. | .. | .. | .. | .. | .. | 1 | 2 |
| Ostitis | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Paratyphoid | .. | .. | .. | .. | 1(1) | .. | .. | .. | 1 |
| Plague | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Polio-myelitis | .. | .. | .. | 4(4) | .. | .. | .. | .. | 4 |
| Puerperal Fever | 2 | .. | 3 | .. | .. | .. | .. | .. | 5 |
| Rubella | .. | 5(5) | .. | 2 | .. | .. | .. | .. | 7 |
| Salmonella Infection | .. | .. | .. | 2(2) | .. | .. | .. | .. | 2 |
| Scarlet Fever | 8(2) | 12(5) | 1(1) | 2 | .. | 1 | .. | .. | 24 |
| Smallpox | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Tetanus | .. | .. | 1 | .. | .. | .. | .. | .. | 1 |
| Trachoma | .. | .. | .. | .. | .. | .. | 3 | .. | 3 |
| Trichinosis | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Tuberculosis | 8(7) | 21(15) | .. | 4(4) | 4 | 2(2) | .. | 1 | 40 |
| Typhoid Fever | .. | .. | 11(6) | .. | .. | .. | .. | .. | 11 |
| Typhus (Flea-, Mite- and Tick-borne) | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Typhus (Louse-borne) | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Yellow Fever | .. | .. | .. | .. | .. | .. | .. | .. | .. |

¹ Figures in parentheses are those for the metropolitan area.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Post-Graduate Conference at Wollongong.

THE Post-Graduate Committee in Medicine in the University of Sydney, in conjunction with the South-Eastern Medical Association, will hold a post-graduate conference at the Wollongong General Hospital on Saturday and Sunday, July 16 and 17, 1960. The programme is as follows:

Saturday, July 16: 1.45 p.m., registration; 2 p.m., "Coronary Artery Disease", Professor R. B. Blacket; 3 p.m., "The Acute Abdomen", Dr. Eric Goulston; 4.30 p.m., "Acute Gastro-Enteritis in Infancy and Childhood", Dr. John Beveridge.

Sunday, July 17: 9.30 a.m., "Valvular Diseases of the Heart", Professor R. B. Blacket; 11 a.m., "Some Surgical Problems in Children", Dr. Eric Goulston; 12 noon, "Current Problems in Paediatrics", Dr. John Beveridge.

The fee for attendance at the course is £3 3s., and those wishing to enrol are requested to make early written application to the South-Eastern Medical Association, 39 Market Street, Wollongong. After hours, applicants should communicate with Dr. Peter J. Geddes, Honorary Secretary, 2 Campbell Street, Woonona. Telephone: Corrimall 8 3354.

SEMINARS AT ROYAL PRINCE ALFRED HOSPITAL.

SEMINARS will be held at the Royal Prince Alfred Hospital, Sydney, during the second half of 1960 on Fridays from 1.15 p.m. to 2.15 p.m., in the Scot Skirving Lecture Theatre. The programme from July 15 to November 4 is as follows:

July 15, Hematology Section, "Bone Marrow Transfer in Experimental Mice: Analysis of Cell Population", Professor C. E. Ford, M.R.C., Radio-biology Research Unit, Harwell, England, by invitation. July 22, Endocrinology Section, "Hormones and Electrolytes", Professor James Dauphinee, University of Toronto, by invitation. July 29, Cardiology Section, "Dissecting Aneurysm", Mr. A. Grant and Dr. L. Bernstein.

August 5, Neurology Section, "The Myopathies", Dr. J. L. Allsop. August 12, Psychiatry Section, "Psychological Reactions to Illness and Hospitalization", Dr. D. C. Maddison. August 19, Thoracic Section, "Pulmonary Fungus Diseases", Dr. M. R. Joseph and Dr. J. Johnson. August 26, Paediatrics Section, "Iatrogenic Illness in Paediatrics", Dr. S. P. Bellmaine.

September 2, Renal Section, "Renal Tuberculosis", Dr. H. M. Learoyd. September 9, Gastro-Enterology Section, "Gastro-Enterology and Stomach Ulceration", Mr. Norman Tanner, Charing Cross Hospital, London, by invitation.

September 16, Thoracic Section, "Smoking and Lung Cancer", Professor Bradford Hill, University of London, by invitation. September 23, Neurology Section, "A Study of 30 Years' Experience with Cerebral Tumour at Royal Prince Alfred Hospital", Mr. J. N. Segelov. September 30, Cardiology Section, "The Assessment of Diagnostic Criteria in Cardiology", Dr. A. D. Jose.

October 7, Dermatology Section, "The Mind and the Skin and The Body and the Skin", Dr. M. A. Obermaier, University of Southern California, by invitation. October 14, Royal Prince Alfred Hospital Reunion, Surgical Seminar, Professor F. E. Stock, Hong Kong, by invitation. October 21, Royal Prince Alfred Hospital Reunion, no seminar. October 28, Gastro-Enterology Section, "Pepsin, Pepsinogen and Gastro-Duodenal Diseases", Dr. R. S. Packard.

November 4, Thoracic Section, "Non-Operative Therapy of Lung Cancer", Dr. T. Reeves, Royal North Shore Hospital, by invitation and Dr. D. L. Green.

Owing to the unusually large number of overseas visitors, whose programmes are not all finalized, there may be a number of alterations to this programme.

Deaths.

THE following deaths have been announced:

REGAN.—Marcus Grattan Regan, on June 19, 1960, in Canada.

ATKINSON.—Reginald Cyril Everitt Atkinson, on June 20, 1960, at Perth.

MACGILLICUDDY.—Cyril Florence Macgillcuddy, on June 20, 1960, at Hawthorn, Victoria.

Diary for the Month.

JULY 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee; Organization and Science Committee.

JULY 14.—New South Wales Branch, B.M.A.: Public Relations Committee.

JULY 15.—New South Wales Branch, B.M.A.: Ethics Committee.

JULY 18.—Victorian Branch, B.M.A.: Finance Sub-Committee.

JULY 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

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